

Species Diversity, 2001, 6, 23–63

## Conifer-feeding Webspinning Sawflies of the Genus *Acantholyda* (Hymenoptera: Pamphiliidae) of Japan

Akihiko Shinohara

Department of Zoology, National Science Museum, 3-23-1 Hyakunin-chō,  
Shinjuku-ku, Tokyo, 169-0073 Japan  
E-mail: shinohar@kahaku.go.jp

(Received 18 July 2000; Accepted 23 January 2001)

The conifer-feeding webspinning sawfly genus *Acantholyda* is reviewed for Japan. Fourteen species, one of which has two subspecies, are recognized and keyed. Of these, two species and one subspecies, *A. mizunoi* from central Honshu (host plant: *Tsuga*), *A. tsuyukii* from central Honshu and Shikoku (host plant: *Tsuga*), and *A. aglaia stigma* from central Honshu (host plants: *Picea* and *Abies*), are described as new. This is the first Palearctic host plant record of *Acantholyda* from a species of *Abies*. Descriptions are given for the previously unknown males of *A. albomaculata* Shinohara, 1985 and *A. iwatai* Takeuchi, 1938, and *A. iwatai* is newly recorded from Shikoku and Kyushu. New host plant records are given for *A. nipponica* Yano and Sato, 1928 and *A. sasakii* (Yano, 1916).

**Key Words:** Hymenoptera, Pamphiliidae, *Acantholyda*, Japan, new species, new subspecies, new host records.

*Acantholyda* is a genus of the conifer-feeding webspinning sawfly subfamily Cephalciinae. It is Holarctic in distribution and comprises over 60 species, of which 34 occur in North America (Middlekauff 1958; Greenbaum 1975; Smith 1988), ten in Europe and from Turkey to Siberia (Benson 1968; Verzhutskij 1981; Achterberg and Aartsen 1986; Shinohara 1988), ten in China, Taiwan, and Korea (Xiao *et al.* 1992; Shinohara 1991a, 2000; Shinohara and Byun 1996), and one unidentified species in Myanmar (Beneš 1972). In Japan, 12 species have been recorded (Takeuchi 1938; Shinohara 1985, 1991b, 1995, 2000; Shinohara and Hara 2000).

Adults of *Acantholyda* species are easily distinguished from other pamphiliids by the presence of one or two subapical spurs on each of the fore tibiae. Larvae are solitary or gregarious webspinners on various conifers of the family Pinaceae belonging to the genera *Pinus*, *Larix*, *Picea*, *Abies*, *Tsuga*, and *Pseudotsuga* (Middlekauff 1958; Xiao *et al.* 1992; Shinohara 1997, 2000; Taeger *et al.* 1998; Shinohara and Hara 2000), and some species are regarded as pests of these plants.

This paper is a systematic review of the Japanese species of *Acantholyda*. Takeuchi (1938) keyed six species (one of them with one “variety”) of this genus from Japan, and that is the most recent work treating the entire *Acantholyda* fauna of Japan. Shinohara (1985, 1991b, 2000) and Shinohara and Hara (2000) described six new species and one new subspecies from Japan. After studying all major collections of Japanese *Acantholyda* known to me, I recognize now 14 species, one of them with two subspecies, in Japan. Two species and one subspecies are new to science. Table 1 shows the 15 Japanese species and subspecies

with their distributional ranges and host plants.

Material used in this work is deposited in the National Science Museum, Tokyo, unless otherwise indicated. Abbreviations for other depositories are: EU-Ehime University, Matsuyama; HU-Hokkaido University, Sapporo; KN-K. Nakamura's private collection, Utsunomiya; KU-Kobe University, Kobe; OMNH-Osaka Museum of Natural History, Osaka; UOP-University of Osaka Prefecture, Sakai; YM-M. Yamada's private collection, Hirosaki. Names of Japanese host plants follow Ohwi (1965).

#### Genus *Acantholyda* A. Costa, 1894

*Acanthocnema* A. Costa, 1860: 2 (suppressed by Opinion 290, International Commission on Zoological Nomenclature 1954).

Type species: *Tenthredo erythrocephala* Linnaeus, 1758; subsequent designation by Benson (1945).

*Acantholyda* A. Costa, 1894: 232.

Type species: *Tenthredo erythrocephala* Linnaeus, 1758; subsequent designation by Rohwer (1910).

For more references, see Middlekauff (1958).

**Diagnosis.** Adult length 8.5–16 mm; postgenal carina present or absent; antenna with 26–40 segments, with scape seldom shorter than 3rd segment, usually equal or longer, and with 3rd segment about 1.9–3.2× the length of 4th; fore tibia with 1 (rarely 2) preapical spur(s); tarsal claws each with 1 small subapical tooth; wing membranes irregularly coriaceous apically; of veins in forewing, Sc1 joining C before point of origin of Rs from R; cell C in forewing glabrous or pilose; stub of crossvein m+cu-a in forewing absent or very short; apical stub of vein 2A in hindwing present or absent; male genitalia with harpes relatively long and slender; ovipositor with radices in first valvulae and central portion of fused second valvulae strongly dilated. Egg more or less banana shaped with pointed ends, or cylindrical with rounded ends.

**Remarks.** *Acantholyda* is one of the two genera comprising the tribe Cephalciini (Beneš 1968). *Acantholyda* and *Cephalcia*, the other genus of the tribe, are easily separated by the presence or absence of the preapical spur(s) on the fore tibia (e.g., Ross 1937). Benson (1945) added the possible intergeneric difference in host plants, but this has been found invalid (Middlekauff 1958).

The following additional features have been proposed as being useful for distinguishing *Acantholyda* from *Cephalcia* (character states in *Cephalcia* are in brackets):

- 1) Average number of antennal segments 32 [26] (Middlekauff 1958); antennae with 26–40 segments [22–30 segments] (Beneš 1968).
- 2) “Scape seldom shorter than segment three, usually equal or longer” [“always shorter than segment three”] (Middlekauff 1958: 72).
- 3) Cell C in the forewing glabrous [pilose] in European species (Beneš 1974; Achterberg and Aartsen 1986). At least in three species occurring in Japan, *A. tsuyukii* n. sp., *A. iwatai* Takeuchi, 1938, and *A. aglaia* Zhelochovtsev, 1968, the cell C in the forewing is more or less pilose.

Webspinning sawfly genus *Acantholyda* of Japan

25

Table 1. Japanese species of *Acantholyda*.

Species	Distributional ranges	Host plants
<i>Subgenus Acantholyda</i> A. Costa, 1894 <i>Acantholyda nipponica</i> Yano and Sato, 1928	Japan (Hokkaido, northern to central Honshu)	<i>Pinus strobus</i> , <i>P. pumila</i> , ? <i>P. densiflora</i> , ? <i>P. thunbergii</i> , <i>Larix leptolepis</i>
<i>Subgenus Itycorsia</i> Konow, 1897 <i>Acantholyda sasakii</i> (Yano, 1916)	Japan (Honshu)	<i>Pinus densiflora</i> , <i>P. parviflora</i> var. <i>pentaphylla</i> , <i>P. koraiensis</i>
<i>Acantholyda albomaculata</i> Shinohara, 1985	Japan (central to western Honshu, Shikoku)	Unknown
<i>Acantholyda iwatai</i> Takeuchi, 1938	Japan (northern to central Honshu, Shikoku, Kyushu)	Unknown
<i>Acantholyda mizunoi</i> n. sp.	Japan (central Honshu)	<i>Tsuga diversifolia</i>
<i>Acantholyda tsuyukii</i> n. sp.	Japan (central Honshu, Shikoku)	<i>Tsuga diversifolia</i>
<i>Acantholyda flaviventris</i> Shinohara, 1991	Japan (central Honshu)	Unknown
<i>Acantholyda posticalis posticalis</i> (Matsuura, 1912)	Japan (western to central Honshu, Shikoku, Kyushu, Tsushima; lowlands to lower mountains)	<i>Pinus densiflora</i>
<i>Acantholyda alpina</i> Shinohara, 2000	Japan (northern to central Honshu: alpine <i>Pinus pumila</i> zone)	Unknown, but most probably associated with <i>P. pumila</i>
<i>Acantholyda kumamotoi</i> Shinohara, 2000	Japan (northern Honshu)	Unknown
<i>Acantholyda kojimai</i> Shinohara, 2000	Japan (northern to central Honshu: montane to alpine <i>Pinus pumila</i> zones)	<i>Pinus parviflora</i> , <i>P. pumila</i>
<i>Acantholyda pirica</i> Shinohara, 2000	Japan (Hokkaido: alpine <i>Pinus pumila</i> zone), Sakhalin	Unknown, but most probably associated with <i>P. pumila</i>
<i>Acantholyda aglaia yezoensis</i> Shinohara and Hara, 2000	Japan (Hokkaido)	<i>Picea abies</i>
<i>Acantholyda aglaia stigma</i> n. subsp.	Japan (central Honshu)	<i>Picea shirasawae</i> , <i>P. koyamae</i> , <i>Abies</i> sp.
<i>Acantholyda lericis</i> (Giraud, 1861)	Japan (central Honshu), China, Siberia, Europe	<i>Larix decidua</i> , <i>L. sibirica</i> , <i>L. gmelini</i>

- 4) Stub of m+cu-a ("Brachialquerader") in forewing absent or very short [long] (Konow 1897).
- 5) Harpes of male genitalia relatively long and slender [relatively broad] (Middlekauff 1958).
- 6) In male genitalia, "an additional lobe, probably the cuspis (cus), or a part of it" present [absent] (Eidt 1969: 16). In Japanese species of *Acantholyda*, this "additional lobe" (Eidt 1969, fig. 38) is absent or very inconspicuous in *A. mizunoi* n. sp., *A. tsuyukii*, and *A. alpina* Shinohara, 2000.
- 7) Radix in each first valvula strongly dilated [weakly dilated] (Eidt 1969).
- 8) Fused second valvulae with central portion strongly dilated [slightly so at most] (Eidt 1969).
- 9) Sawsheath ("apical lobe of gonostylus") angular, especially ventrad, with a much reduced peg [rounded with a short peg] ("*A. tessellata*, the only member of the subgenus *Acantholyda* examined, is exceptional, with the gonostyli more like those of *Cephalcia*, but without the apical peg") (Eidt 1969: 16).
- 10) Egg more or less banana shaped and always pointed at the ends [cylindrical with rounded ends] (Eidt 1969). As discussed by Shinohara (1997), the banana-shaped egg is characteristic of the subgenus *Itycorsia*, not of *Acantholyda* as a whole.

Unfortunately, none of these differences is quite clear-cut, and character states are still unknown for most of the species. For characters 6)–10), Eidt (1969) did not give the names of the *Acantholyda* species he examined for morphological studies, and therefore the validity of these differences is unclear. At least characters 3), 6), and 10) cannot be regarded as intergeneric differences, as noted above, although they may be useful for defining subgroups within *Acantholyda*.

The monophyly of *Acantholyda* is well supported by the presence of the preapical spur(s) on each fore tibia, a unique feature known only for the members of this genus.

**Subgeneric division.** Konow (1897) proposed the subgenus *Itycorsia* [type species: *Tenthredo hieroglyphica* Christ, 1791; subsequent designation by Rohwer (1910)] for those species characterized by a sharp postgenal carina. Ross (1937: 109) synonymized *Itycorsia* with *Acantholyda*, stating that "the character is not constant enough for accurate use." Middlekauff (1958), however, revived *Itycorsia*, introducing a new character, the presence or absence of the apical stub of 2A in the hindwing; it is present in *Acantholyda* s. str., whereas it is usually absent in *Itycorsia*.

Ten of the 14 Japanese species of *Acantholyda* can be placed in subgenera based on these two characters without problem, but four species are more or less problematical in this regard. In *A. sasakii* (Yano, 1916), which is here treated as a member of the subgenus *Itycorsia* (see comments under that species), the postgenal carina is usually very blunt, often indistinct, though still recognizable, whereas the hindwing always has a distinct apical stub of vein 2A. In *A. aglia yezoensis* Shinohara and Hara, 2000, which is placed in the subgenus *Itycorsia*, the postgenal carina is constantly sharply carinate, but the females always have a distinct apical stub of vein 2A, which is usually absent in the males. Also, the females of *A. iwatai* and *A. albomaculata* Shinohara, 1985, both *Itycorsia* species, sometimes have a distinct apical stub of this vein. Similar examples from exotic fauna include *A. servica* Vasić, 1962, from southeastern Europe, which has neither the postgenal carina nor

the stub of vein 2A in the hindwing (Pesarini and Pesarini 1976), and *A. taiwana* Shinohara, 1991, from Taiwan, which has a distinct, though blunt, postgenal carina and a distinct, long stub of vein 2A in the hindwing (Shinohara 1991a). The existence of such intermediate forms suggests a certain inadequacy of the subgeneric division.

On the other hand, I (Shinohara 1997) pointed out that, of the 12 species of *Acantholyda* for which eggs had been clearly described, five species belonging to the subgenus *Acantholyda* had an elongate-oval egg with rounded ends, while seven species belonging to the subgenus *Itycorsia* had a more or less banana-shaped egg with pointed ends (two additional species of *Itycorsia*, *A. sasakii* and *A. kojimai* Shinohara, 2000, are now known to have banana-shaped eggs). The banana-shaped egg is apparently specialized and may be regarded as an apomorphic character supporting the monophyly of *Itycorsia*. This hypothesis needs further study, since the egg shape is known only for one-fifth of the known species of the genus. Nevertheless, I tentatively accept the subgeneric division of *Acantholyda* into *Acantholyda* s. str. and *Itycorsia*. It seems quite probable to me that such a division is not artificial but reflects phylogeny.

### Key to Japanese species

#### Females

1. Postgenal carina absent; hindwing with apical stub of 2A present. Egg elongate-oval with rounded ends ..... Subgenus *Acantholyda*  
Head reddish brown and thorax and abdomen entirely bluish-black; wings strongly blackish infuscated, apical third more weakly so (Fig. 1A, B) ..... *A. (A.) nipponica*
- Postgenal carina present, usually sharply defined (usually blunt or indistinct but recognizable in *A. sasakii*); hindwing usually lacking apical stub of 2A (present in *A. sasakii*, often in *A. aglaia*, and sometimes in *A. albomaculata* and *A. iwatai*). Egg banana-shaped ..... Subgenus *Itycorsia*...2
2. Postgenal carina usually blunt or indistinct but recognizable; hindwing with apical stub of vein 2A present. Head including antennae, thorax usually including entire mesoscutellum, and part of abdomen black with slight metallic luster, and abdomen with at least lateral margins (often most of dorsum) and part of venter reddish brown; wings weakly blackish infuscated (Fig. 1E–H).....  
*A. (I.) sasakii*
- Postgenal carina sharply defined; hindwing with apical stub of vein 2A usually absent. Coloration not as above: head and thorax without metallic luster; mesoscutellum usually with pale mark except in *A. laricis*.....3
3. Tegula blackish brown to black .....4
- Tegula pale yellow .....5
4. Antenna black, with median segments creamy white; all tibiae and tarsi blackish brown to black; abdomen black, with lateral margins creamy white (Fig. 1K–L).....  
*A. (I.) albomaculata*
- Antenna pale brown, becoming blackish towards apex, with scape and often part of pedicel black; all tibiae and tarsi brown; abdomen entirely black (Fig. 4C–D) .....  
*A. (I.) iwatai*

5. Dorsal part of para-antennal field distinctly punctate and pilose (e.g., Fig. 3B–C) ..... 6
- Dorsal part of para-antennal field impunctate and glabrous (Fig. 3E–F) ..... 7
6. Punctures on clypeus, frons, ocellar area, and in dorsal part of para-antennal field very dense and generally well-defined (Fig. 5C); antennal scape pale brown, rarely marked with black (Fig. 5C); mesoscutal median lobe entirely black (Fig. 4G), with several distinct punctures; forewing with apical half rather uniformly infuscated; cell C of forewing glabrous ..... *A. (I.) mizunoi*
- Punctures on clypeus, frons, ocellar area, and in dorsal part of para-antennal field rather sparse, sometimes ill-defined (Fig. 5E); antennal scape black (Fig. 5E); mesoscutal median lobe with pale yellow mark (Fig. 4K), entirely impunctate; forewing usually with dark band below stigma; cell C of forewing pilose ..... *A. (I.) tsuyukii*
7. Wings uniformly weakly infuscated or hyaline; stigma pale brown to dark yellow, narrow outer margin often darkened ..... *A. posticalis* group ..... 8
- Wings entirely or partly blackish infuscated; stigma at least with basal half blackish brown to black (Fig. 7E, I) ..... 12
8. Anterior margin of clypeus with lateral parts distinctly, almost angularly, produced (Shinohara 2000, fig. 11A) ..... *A. (I.) pirica*
- Anterior margin of clypeus with lateral parts not or only weakly roundly produced (Shinohara 2000, figs 9C, E, 11C, D) ..... 9
9. Body length usually around 11 mm, with range 9.5–12 mm, head width 2.6–3.0 mm; wings very faintly grayish infuscated, not brownish, with veins except for those along anterior margin of forewing weakly pigmented, thus rather inconspicuous. Mandible usually with large black mark mid-basally on ventral surface; whitish yellow mark on mesonotum well developed, forming complete circle ..... *A. (I.) alpina*
- Body length usually over 12 mm, though varying from 11 to 15 mm, head width 2.9–4.0 mm, except for one small species, *A. kumamotoi* (length about 10 mm, head width 3.2 mm); wings usually distinctly brownish with veins darkly pigmented, conspicuous. Mandible often without large black mark mid-basally; whitish yellow mark on mesonotum usually not well developed, at least broken at anterior part of mesoscutal lateral lobe ..... 10
10. Abdomen pale brownish above, with only propodeum, basal part of 2nd tergum, and most of 9th tergum blackish; pseudosternum with pale yellow mark. Small species (length 10 mm, head width 3.2 mm); antennal scape largely pale brown above ..... *A. (I.) kumamotoi*
- Abdomen often largely blackish above; at least propodeum, most of 2nd tergum, and median parts of other terga basally blackish; pseudosternum usually entirely black. Length 11–15 mm; antennal scape often largely black ..... 11
11. Body length 11.5–15 mm, commonly around 13 mm or larger, head width 3.2–3.8 mm. Pale area on para-antennal field usually connected with anterior part of supraocular stripe; antennal scape often largely pale yellow ..... *A. (I.) posticalis posticalis*
- Body length 11–13 mm, head width 2.9–3.3 mm. Pale area on para-antennal field separated from anterior part of supraocular stripe; antennal scape usually mostly black ..... *A. (I.) kojimai*
12. Body length 12.5–14 mm (reared specimens 9.5–11 mm); wings almost uniformly

- blackish infuscated, sometimes with costal and basal areas only weakly so; antenna with scape usually entirely pale brown (Japanese subspecies only; nominotypical subspecies from Siberia and Primorskij Kraj with black-marked scape and pedicel); mesoscutellum marked with yellow (Fig. 7E) (Three subspecies, two of them occurring in Japan) ..... *A. (I.) aglaia*
- a. Stigma with basal two-thirds blackish brown and apical third (except for anterior and posterior margins) pale brown ..... *A. (I.) aglaia yezoensis*
  - Stigma entirely blackish brown ..... *A. (I.) aglaia stigma*
- Body length 9–10.5 mm; wings blackish infuscated, but apical third of forewing only weakly so or hyaline; antennal scape black except for radicula and extreme apex; mesoscutellum usually entirely black (Fig. 7I) ..... *A. (I.) laricis*

### Males

1. Postgenal carina absent at least in ventral part; hindwing with apical stub of vein 2A present ..... Subgenus *Acantholyda*  
Head, thorax and abdomen bluish-black, with only clypeus and ventral parts of frons and para-antennal fields pale yellow, and posterior margin of each sternum often with medial pale mark; wings strongly blackish infuscated, apical third more weakly so (Fig. 1C–D) ..... *A. (A.) nipponica*
- Postgenal carina sharply defined at least in ventral part; hindwing lacking apical stub of vein 2A, except in *A. sasakii* ..... Subgenus *Itycorsia* ..... 2
2. Postgenal carina with dorsolateral part very blunt or obsolete; hindwing with apical stub of vein 2A present. Black with very faint bluish or purplish metallic luster; head with clypeus, frons, para-antennal fields, and most of gena pale yellow; dorsum of thorax usually without pale markings but venter of thorax often so marked; each femur with anterior surface pale yellow; wings weakly blackish infuscated, with blackish veins and stigma; dorsum of abdomen with very narrow lateral margins pale yellow; venter of abdomen with broad posterior margin of each segment and most of subgenital plate pale yellow (Fig. 1I–J) ..... *A. (I.) sasakii*
- Postgenal carina with dorsolateral part as sharply defined as ventral part; hindwing lacking apical stub of vein 2A. Coloration not as above ..... 3
3. Thorax black, usually without pale markings; tegula dark brown to black, at least partly; abdomen often entirely black or nearly so ..... 4
- Thorax with pale yellow markings; tegula pale yellow; abdomen with at least lateral margins distinctly pale ..... 6
4. Antenna with basal 3 segments (except narrow apex and ventral surface of 3rd segment) and apical third of its length black and median segments creamy white; all tibiae and tarsi blackish brown to black (Fig. 4A–B). Head capsule entirely black; abdomen almost entirely black ..... *A. (I.) albomaculata*
- Antenna brown, darkened towards apex, often with scape and pedicel black dorsally; all tibiae and tarsi pale brown. Head with at least para-antennal fields marked with pale yellow; abdomen entirely black, or with lateral margins pale yellow ..... 5
5. Antenna with scape and sometimes pedicel black dorsally; head usually with only para-antennal fields pale yellow, but sometimes with separate pale yellow mark on clypeus; abdomen usually entirely black, at most with only subgenital plate marked with pale yellow (Figs 4E–F, 5B) ..... *A. (I.) iwatai*

- Antenna with scape and pedicel entirely pale brown, without black markings; para-antennal fields, most of clypeus, and supraclypeal area covered with one large, yellow mark; abdomen often with lateral margins and subgenital plate marked with pale yellow (Figs 4I–J, 5D) ..... *A. (I.) mizunoi*
- 6. Dorsal part of para-antennal field distinctly punctate and pilose (Fig. 3D) ..... 7
- Dorsal part of para-antennal field impunctate and glabrous (e.g., Fig. 3E–F) ..... 8
- 7. Body length 11.5 mm; antenna with scape and pedicel entirely pale brown, without black markings; cell C of forewing glabrous; hind femur without black markings; abdomen mostly pale brown above (Figs 7C–D, 8B) .....  
..... *A. (I.) flaviventris*
- Body length 9–10.5 mm; antenna with scape and often pedicel black-marked dorsally; cell C of forewing pilose; hind femur usually largely black, at least with black mark on dorsal surface; abdomen black above with only lateral margins pale yellow (Figs 5F, 7A–B, 8A) ..... *A. (I.) tsuyukii*
- 8. Wings uniformly weakly infuscated or hyaline; stigma pale brown to dark yellow, narrow outer margin often darkened ..... *A. posticalis* group ..... 9
- Wings at least partly blackish infuscated; stigma at least with basal half blackish brown to black (Fig. 7G, K) ..... 12
- 9. Anterior margin of clypeus with its lateral parts distinctly, almost angularly produced (Shinohara 2000, fig. 11F) ..... *A. (I.) pirica*
- Anterior margin of clypeus with its lateral parts not or only weakly roundly produced (Shinohara 2000, figs 7B, 9D, F) ..... 10
- 10. Body length 8–9.5 mm, head width 2.3–2.7 mm; wings very faintly grayish infuscated, not brownish, with veins except for those along anterior margin weakly pigmented, thus rather inconspicuous. Mandible usually with small black mark mid-basally on ventral surface; pale mark on mesoscutal lateral lobe usually present ..... *A. (I.) alpina*
- Body length 9–12 mm, head width 2.6–3.4 mm; wings usually distinctly brownish, with veins darkly pigmented, conspicuous. Mandible without blackish mark on ventral surface; pale mark on mesoscutal lateral lobe often absent ..... 11
- 11. Body length 11–12 mm, head width 3.2–3.4 mm; whitish yellow area on para-antennal field broadly fused with whitish yellow area around antennal socket; dorsum of abdomen varying from black with only lateral margins pale brown to black with posterior half largely pale brown ..... *A. (I.) posticalis posticalis*
- Body length 9–11 mm, head width 2.6–3.0 mm; whitish yellow area on para-antennal field disconnected from, or very narrowly fused with whitish yellow area around antennal socket; abdomen black above, with only lateral margins pale brown ..... *A. (I.) kojimai*
- 12. Body length 11–12.5 mm; wings almost uniformly blackish infuscated; antenna with scape and pedicel entirely pale brown; mesoscutellum marked with yellow; venter of thorax entirely black (Fig. 7G–H) (Three subspecies, two of them occurring in Japan) ..... *A. (I.) aglaia*
  - a. Stigma with basal two-thirds blackish brown and apical third (except for anterior and posterior margins) pale brown ..... *A. (I.) aglaia yezoensis*
    - Stigma entirely blackish brown ..... *A. (I.) aglaia stigma*
  - Body length 8.5 mm; wings blackish infuscated, but apical third of forewing only weakly so or hyaline; antenna with scape and often pedicel with black mark dorsally; mesoscutellum usually entirely black; venter of thorax with

large pale marks (Fig. 7K–L) ..... *A. (I.) laricis*

***Acantholyda (Acantholyda) nipponica* Yano and Sato, 1928**  
 (Figs 1A–D, 2A–B)

*Acantholyda erythrocephala*: Takeuchi 1923: 363 [part; not Linnaeus 1758: 558].

*Acantholyda (Acantholyda) nipponica* Yano and Sato, 1928: 209.

*Acantholyda nipponica*: Takeuchi 1930: 4; Inoue 1960: 12; Shinohara and Smith 1979: 283; Abe and Togashi 1989: 541; Shinohara 1997: 192.

See Shinohara (1997) for more references.

**Distribution.** Japan (Hokkaido, northern to central Honshu).

**Type material examined.** ♀ (lectotype [from Tokyo], Fig. 1A–B), “Chalast. No. 189” [red] “189” “Lectotype, *Acantholyda nipponica* Yano et Sato, det. A. Shinohara, 1979”; 1 ♂ (paralectotype), “Chalast. No. 189” [red].

**Other material examined.** Material listed by Shinohara (1997). Hokkaido. 374 ♀ and 274 ♂; Honshu—12 ♀ and 8 ♂ from Aomori, Miyagi, Saitama, Tokyo, Yamagata, Nagano, and Ishikawa Prefectures. Additional material. Honshu—Aomori Pref.: 1 ♂, “Mt. Hakkohda (Idodake), 1985 Jul. 21, M. Yamada” (MY). Nagano Pref.: 1 ♀, Sanzenji, 550 m, Nagano city, 22.VI.1985, H. Kojima; 1 ♀, Kitanagaike, 335 m, Nagano city, collected on *Pinus densiflora*, 30.V.1993, H. Kojima; 1 ♀, Mt. Yokoteyama, 2000 m, Shiga-kōgen, larva on *Pinus pumila* collected 9.VIII.1987, adult emerged 29.IV.1988, oviposited on *Pinus pumila* 30.IV., H. Kojima, and 4 ♂, reared in Nagano city from eggs laid by this female, larvae fed on *Pinus pumila*, entered soil 4.VI., adults emerged 23.IV.1989, H. Kojima; 2 ♂, Yamada-bokujo, 1500 m, Takayama village, larvae on *Pinus strobus* collected 10.VII.1990, adult emerged spring 1991, H. Kojima; 1 ♀, Mt. Kenashiyama, 1900 m, ca. 23 km east of Nagano city, collected on *Pinus pumila*, VI.1993, H. Kojima; 1 ♀, Kaida village, 850 m, 26.V.1991, H. Kojima.

**Variation.** As noted by Shinohara (1997), this species shows little variation. The size of all additional specimens listed above falls in the range given by Shinohara (1997). All five females listed above in “Additional material” have a black spot enclosing the ocelli, and three of them have a small black spot on each upper inner orbit. The eight intact antennae of the five females have 26 (one antenna), 27 (two), 28 (three), and 30 (two) segments, with the third segment about 2.6–2.9 times as long as the fourth. The seven additional males examined have only four intact antennae, with 26, 26, 28, and 29 segments, respectively; the third antennal segment is 2.7–2.9 times as long as the fourth in four of the seven males.

**Host plants.** *Larix leptolepis* (Sieb. & Zucc.) Gord., *Pinus strobus* L. (Shinohara 1997); *Pinus pumila* (Pallas) Regel (new record). Watanabe (1937) listed *Pinus densiflora* Sieb. & Zucc. and *Pinus thunbergii* Parl.

**Remarks.** Among the Japanese *Acantholyda*, the female of this species is unique because of its reddish head, somewhat metallic bluish-black thorax and abdomen, and strongly infuscated wings (Fig. 1A–B). The male is also easily recognized by its metallic bluish-black thorax and abdomen and strongly infuscated wings (Fig. 1C–D). This species superficially resembles the Japanese *Cephalcia ishikii* Takeuchi, 1930, which is similarly colored, but its relatively small size and

presence of the preapical spur on the fore tibiae will readily distinguish *A. nipponica* from *C. issikii*.

The closest relative of *A. nipponica* is doubtless *A. erythrocephala* (Linnaeus, 1758), which occurs from Europe across Siberia and China to Korea and was accidentally introduced into eastern North America, but is not found in Japan. Shinohara (1997) gave distinguishing characters between the two species.

*Acantholyda nipponica* was long regarded as a rare species associated with pines in Honshu, but now it is also known as a pest of larch in Hokkaido. For more discussion on the species, see Shinohara (1997).

***Acantholyda (Itycorsia) sasakii* (Yano, 1916)**  
(Figs 1E–J, 2C–D, 3A)

*Tenthredo pratensis* F. var.? Sasaki 1901: 141.

*Lgda* [misprint for *Lyda*] *sasakii* Yano, 1916: 181.

*Acantholyda sasakii*: Takeuchi 1930: 4 [part]; Shinohara 1995: 165.

*Acantholyda sasakii* var. *semirufa* Takeuchi, 1938: 209 [regarded as a subspecies and synonymized with *A. sasakii* by Shinohara (1995)].

For more references, see Shinohara (1995).

**Distribution.** Japan (Honshu).

**Type material examined.** ♀ (holotype of *Acantholyda sasakii* var. *semirufa* Takeuchi, 1938), “Mt. Zawo [=Zaōsan], Boudaira, [Yamagata Pref., 38°07'N, 140°24'E], 7–15.1934, Suzuki, M.” “*Acantholyda sasakii semirufa* Tak., Holotype” (UOP). The type material of the nominotypical subspecies of *A. sasakii* has not been located.

**Other material examined.** Material listed by Shinohara (1995). 15 ♀, 17 ♂ from Miyagi, Fukushima, Ibaraki, Tokyo, Kanagawa, Yamanashi, Nagano, Ishikawa, and Tottori Prefectures. Additional material. Aomori Pref.: 1 ♂, “Isikuradake (Aomori), Jun. 23, 1997, M. Yamada” (MY); 1 ♂, “Hakkouda-AK (Aomori), Jul. 22, 1997, M. Yamada” (MY). Tochigi Pref.: 5 ♂, “Utsunomiya-shi-gai, 1934.4.21.” Saitama Pref.: 1 ♀, “Saitama, Osato, Sakurazawa-mura, 1936.4.26.” Gunma Pref.: 1 ♀, “Kusatsu, Goyoumatsu [=five-needled pine] ?, 23-V-1951, M. Kabe leg.” “*Acantholyda sasakii* Yano” (KU); 1 ♂, “Kusatsu, Karamatsu [=larch] ?, 23-V-1951, M. Kabe leg.” “*Acantholyda sasakii* Yano” (KU). Nagano Pref.: 1 ♀, Kutsuuchi, 1300 m, Shiga-kōgen, collected on *Pinus koraiensis*, 14.VI.1984, H. Kojima; 1 ♀, same locality, collected on *Pinus parviflora* var. *pentaphylla*, 23.VI.1985, H. Kojima; 1 ♀, same locality, collected on *Pinus parviflora* var. *pentaphylla*, 29.V.1988 (lived until 7.VI), H. Kojima; 1 ♂, Hiratoko, 1620 m, Shiga-kōgen, collected on *Pinus koraiensis*, 16.VI.1991, H. Kojima; 1 ♂, Yonako, 750 m, Suzaka city, larva on *Pinus koraiensis* collected 27.VI.1987, adult emerged 29.IV.1988, H. Kojima; 1 ♂, same locality, larva on *Pinus parviflora* var. *pentaphylla* collected 27.VI.1987, adult emerged 29.IV.1988, H. Kojima; 2 ♀ (one shown in Fig. 1E–F), same locality, collected on *Pinus koraiensis*, laid yellow banana-shaped eggs on *P. koraiensis*, 13.VI.1993, H. Kojima; 1 ♀, Happō-one, 1700 m, Mt. Hakubadake, Hakuba village, collected on *Pinus pumila*, 2.VII.1988, H. Kojima; 1 ♀, Kataoka, 850 m, Shiojiri city, larva on *Pinus densiflora* collected VI. 1998, entered soil 2.VII., adult emerged 10.V.1999, H. Kojima; 1 ♀, Fuji-

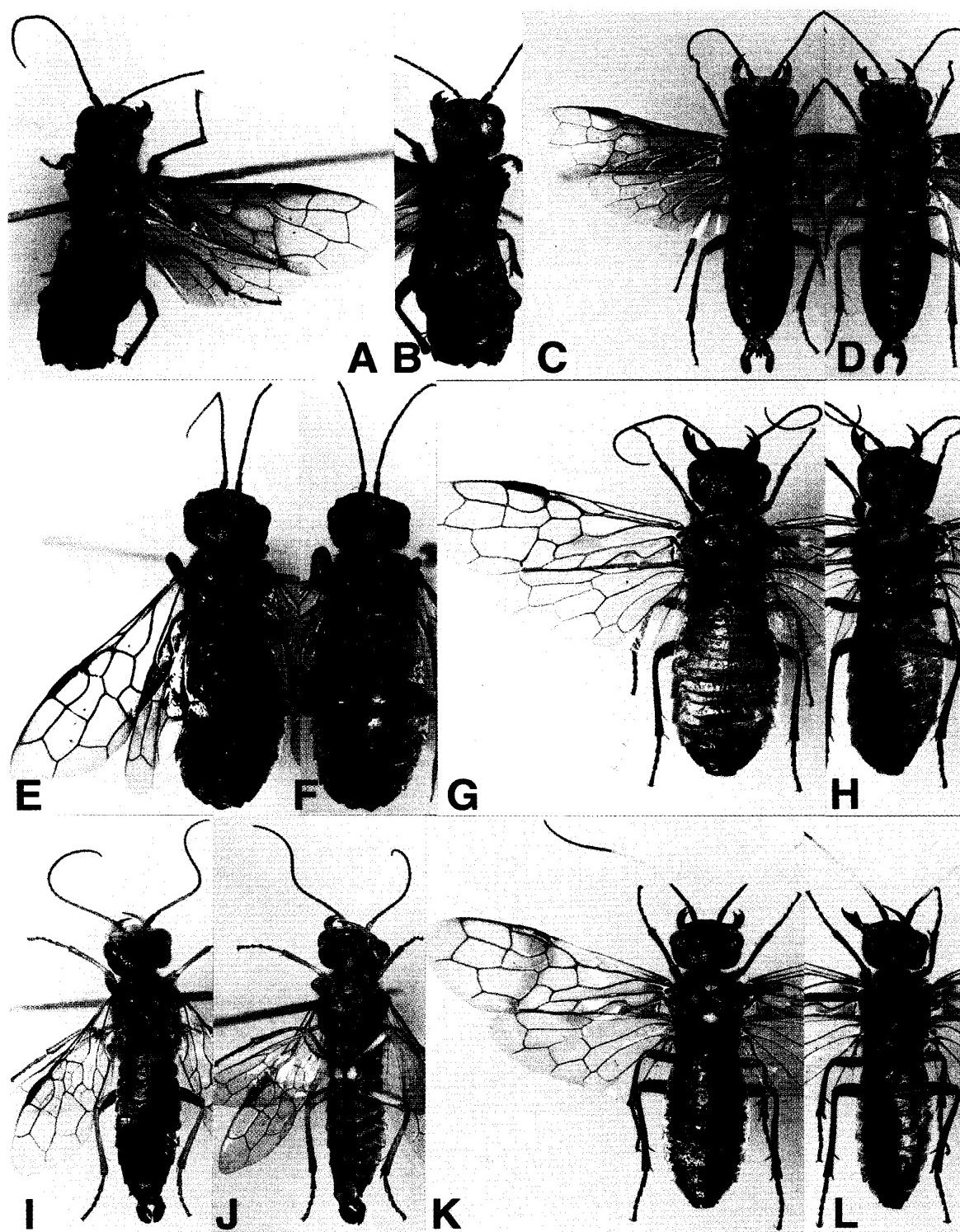


Fig. 1. *Acantholyda* spp., dorsal (A, C, E, G, I, K) and ventral (B, D, F, H, J, L) views. A-B, *A. nipponica*, ♀, lectotype, length about 10 mm; C-D, do., ♂, Zaōsan Mts, Miyagi Pref., length about 11 mm; E-F, *A. sasakii*, ♀, Suzaka city, Nagano Pref., length about 13 mm; G-H, do., ♀, "var. *semirufa*," Zaōsan Mts, Miyagi Pref., length about 13 mm; I-J, do., ♂, Zaōsan Mts, Miyagi Pref., length about 11.5 mm; K-L, *A. albomaculata*, ♀, paratype, Yatsugatake Mts, Nagano Pref., length about 11.5 mm.

sawa, 1100 m, Takatô town, larva on *Pinus densiflora* collected 9.VII.1978, entered soil 13.VII., adult emerged 22.IV.1979, H. Kojima; 1 ♀, Tomigata, 780 m, Ina city, 11.VI.1995, H. Kojima; 1 ♀, no definite data, but probably reared from yellow banana-shaped egg on *Pinus densiflora*, H. Kojima; 1 ♀, no definite data, H. Kojima.

**Variation.** In both sexes the postgenal carina is rather variable; usually the dorsolateral part is very blunt or indistinct, but the ventral part is always distinct and often sharply defined. The hindwing always has a distinct, though usually very short, apical stub of vein 2A.

The 29 females examined range in length from 11.5 to 14.5 mm. In coloration, they agree with the redescription by Takeuchi (1938) except that usually obscure pale marks sometimes occur on the upper frons, the para-antennal field, the clypeus, the vertex along the lateral suture, the ventral margin of the pronotum, or the posterior part of the mesoscutal median lobe, and that the pale mark on the gena is missing or nearly so in a few specimens. In the abdominal coloration, 11 specimens from Tokyo, Kanagawa, Yamanashi, Nagano, and Tottori Prefectures and three specimens without locality data agree with the typical form (only lateral margins reddish brown, Fig. 1E–F), and nine from Yamagata, Miyagi, Fukushima, Ibaraki, Gunma, Yamanashi, and Nagano Prefectures agree with *A. (I.) sasakii semirufa* (second to fourth, fifth, or sixth or third to fifth segments reddish brown, Fig. 1G–H), whereas five others from Saitama and Nagano Prefectures show intermediate conditions (the remaining specimen has no abdomen). One reared, somewhat abnormal specimen (feeding on *P. densiflora*) of “*semirufa*” has almost entirely pale brown antennae (only the scape and the base of the pedicel are black) and wing veins. Thirty-three intact antennae of 23 females have 27 (five antennae), 28 (two), 29 (seven), 30 (four), 31 (four), 32 (seven), 33 (two), and 34 (two) segments; the third segment is about 1.9–2.5 times as long as the fourth in 26 specimens. Cell C in the forewing is glabrous, but at least in a few specimens it is very sparsely pilose; the stub of crossvein  $m+cu-a$  in the forewing is absent or very short, rarely long.

The 26 males examined range in length from 9.5 to 12 mm. In coloration they agree with Takeuchi's (1938) redescription, but some specimens have pale yellow markings on some or all of the following areas: lateral ventral margin and dorsal posterolateral corner of the pronotum, ventral surface of the cervical sclerite, mesoscutal median lobe, tegula, and anterior margins and other parts of the meso- and metepisterna. Twenty-nine intact antennae of 17 males have 27 (two antennae), 28 (one), 29 (seven), 30 (eight), 31 (nine), and 32 (two) segments; the third segment is about 1.9–2.5 times as long as the fourth in 23 specimens. Cell C in the forewing is normally glabrous, but it is very sparsely pilose in a few specimens; the stub of crossvein  $m+cu-a$  in the forewing is usually absent, but a very short stub is present in a few specimens.

**Host plants.** *Pinus densiflora*, *Pinus parviflora* var. *pentaphylla* (Mayr) Henry, *Pinus koraiensis* Sieb. & Zucc. (new record). Sasaki (1901) recorded this species as a pest of pine trees but the pine species was not mentioned. Okutani (1967) noted that the host “pine” was probably *P. densiflora*. This is the first definite host record of this sawfly based on rearing.

**Remarks.** This species is easily separated from the other Japanese species of *Acantholyda* by its coloration; the female is mostly black (very faintly bluish or purplish), with at least the lateral margins of the abdomen reddish brown (Figs

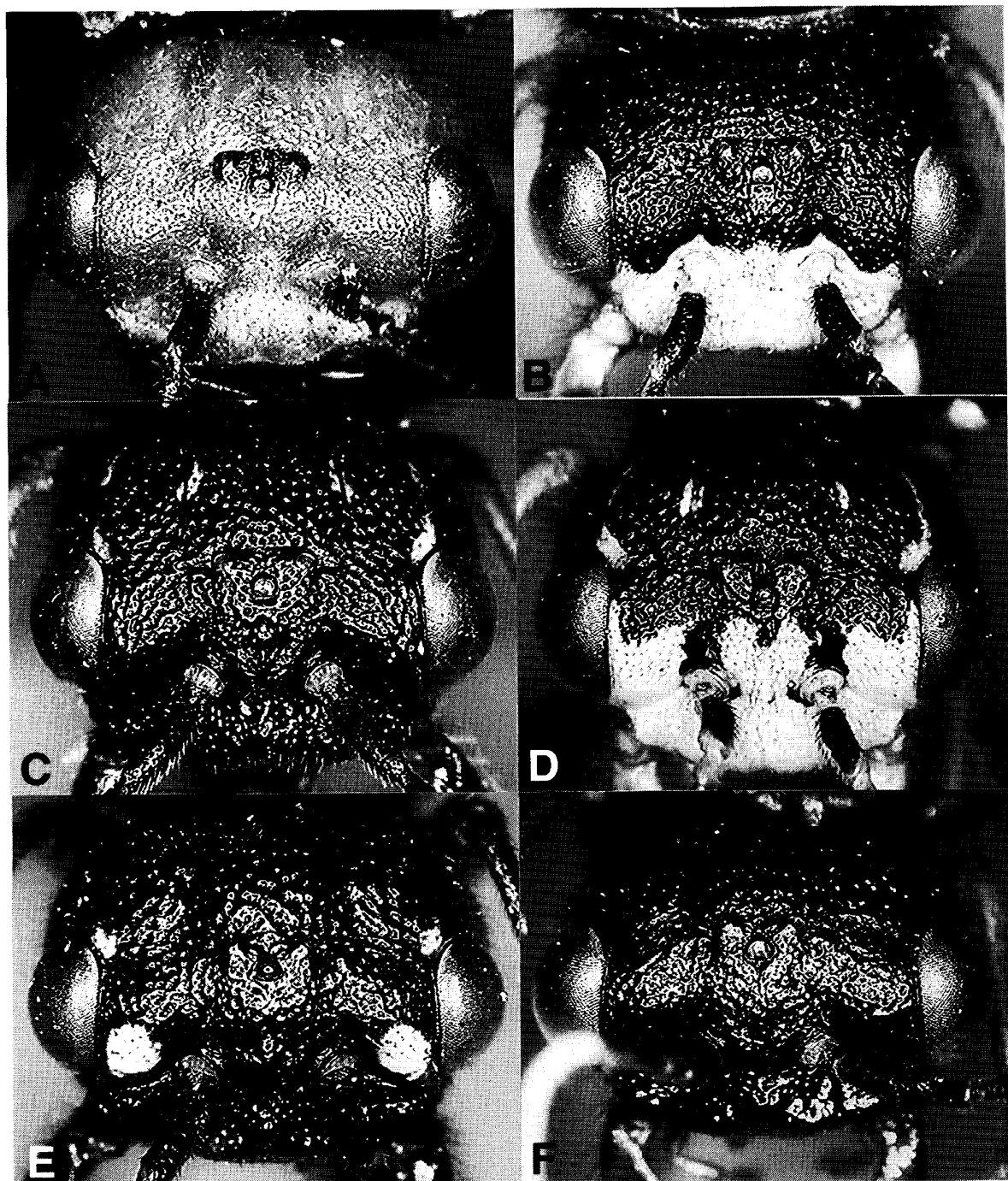


Fig. 2. *Acantholyda* spp., heads, dorsofrontal views. A, *A. nipponica*, ♀, lectotype, width about 3.7 mm; B, do., ♂, Zaōsan Mts, Miyagi Pref., width about 3.0 mm; C, *A. sasakii*, ♀, Zaōsan Mts, Miyagi Pref., width about 3.6 mm; D, do., ♂, Zaōsan Mts, Miyagi Pref., width about 3.0 mm; E, *A. albomaculata*, ♀, paratype, Yatsugatake Mts, Nagano Pref., width about 3.0 mm; F, do., ♂, Mt. Kinpuzan, Yamanashi Pref., width about 2.7 mm.

1E–H, 2C), and the male is black (very faintly bluish or purplish), with the clypeus, para-antennal field, malar space, outer orbit, legs (except for the coxae, trochanters, and posterior aspects of the femora), lateral margins of the abdomen, and posterior margins of the abdominal sterna pale yellow, the wings weakly blackish infuscated, and the stigma blackish brown (Figs 1I–J, 2D). The combination of the entirely black mesoscutellum, pale anterior surface of each femur, blackish-brown stigma, and largely pale-marked venter of the abdomen distinguishes the male of this species from those of more-or-less similarly colored Japanese species.

The subgeneric position of this species is not perfectly clear. Takeuchi (1938: 209) placed *A. sasakii* in the subgenus *Acantholyda*, stating that the “postgenal carina [is] wanting” in this species. The postgenal carina in this species is certainly much less distinct than in ordinary species of *Itycorsia* and the apical stub of vein 2A in the hindwing is always present. However, I regard *A. sasakii* as a species of *Itycorsia*, because the postgenal carina is certainly present, though rather reduced, and the previously unknown egg of this species is banana-shaped, revealing close relationship of this species to *Itycorsia*. The presence of the apical stub of vein 2A in the hindwing may be regarded as a retention of a plesiomorphic character.

Takeuchi (1938) described var. *semirufa* for the specimens with a largely reddish brown abdomen (Fig. 1G–H), and the difference between the two forms in this character is fairly constant within the material I studied (Shinohara 1995). However, I proposed to treat the two forms as individual variations within the same taxon, rather than as separate subspecies, because I failed to find any significant differences between the two forms in other characters of the females and in males and because the two forms might possibly occur sympatrically. The 13 females newly examined in this work (mostly from different localities collected in different years) do not clearly support or refute my hypothesis (see discussion on variation above). To ascertain the true nature of this variation, obviously more material is needed.

As I discussed earlier (Shinohara 1995), records of this species from Korea (e.g., Saito 1928; Takeuchi 1930; Kim 1970; Kim *et al.* 1994) are wrong, and this species is currently known only from Honshu, Japan.

***Acantholyda (Itycorsia) albomaculata* Shinohara, 1985**  
(Figs 1K–L, 2E–F, 4A–B, 6A–C, 10A)

*Acantholyda albomaculata* Shinohara, 1985: 90; Abe and Togashi 1989: 541.

**Male** (hitherto undescribed; description based on a specimen from Hatchodaira, Fig. 4A–B). Length about 10 mm. Head capsule entirely black (Fig. 2F); mandible pale brown, becoming dark ferruginous towards apex; antenna with basal 3 segments black except for creamy white ventral surface of 3rd segment, 4th to 16th or 17th segments creamy white, 13th to 17th segments gradually becoming darker, and 18th to apical segments blackish brown to black. Thorax entirely black. Legs black, with fore and mid tibiae and tarsi and hind tarsus blackish brown and hind tibia brownish black. Wings uniformly and rather strongly infuscated; stigma and veins blackish brown. Abdomen black, with very narrow lateral

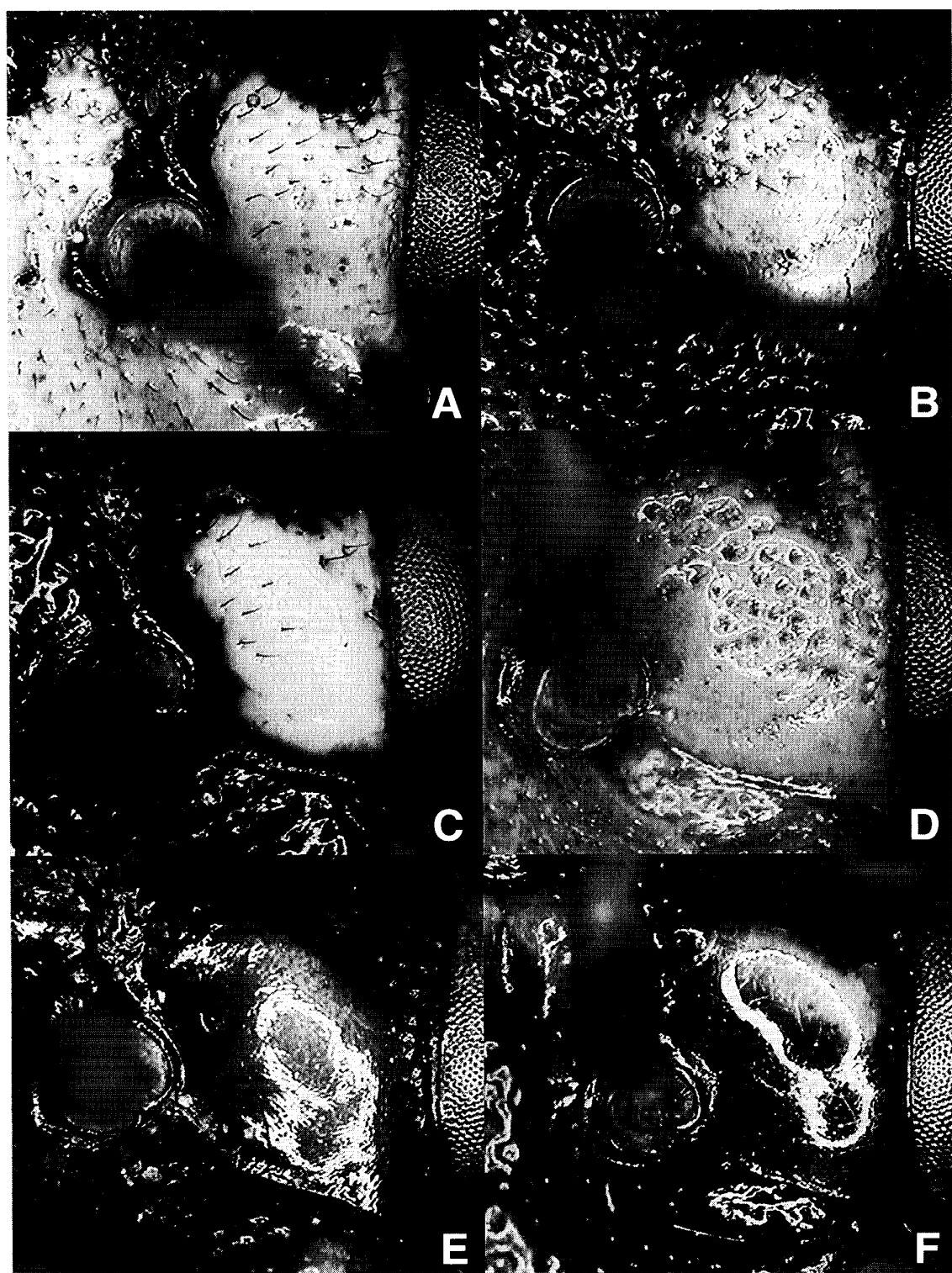


Fig. 3. *Acantholyda* spp., left anterior parts of heads, frontal views, showing pilosity and surface sculpture of para-antennal field. A, *A. sasakii*, ♂, Zaōsan Mts, Miyagi Pref.; B, *A. mizunoi*, ♀, holotype; C, *A. tsuyukii*, ♀, holotype; D, *A. flaviventris*, ♂, holotype; E, *A. aglaia stigma*, ♀, holotype; F, *A. laricis*, ♀, Mikawa, Nagano Pref.

margins of anterior parts of 3rd to 7th terga obscurely creamy white; genitalia entirely blackish brown to black.

Head with transverse, lateral transverse, and coronal sutures indistinct; frons very weakly raised, without distinct median crest; frontal tubercle low, rounded, lying between antennal sockets; ocellar basin small and rather shallow; median fovea indistinct; facial crest very weakly raised, rounded; clypeus weakly roundly swollen medially, about as high as frontal tubercle in lateral view. Head dull, densely punctate, and pilose; para-antennal field with narrow ventral part impunctate and clypeus rather sparsely punctate.

Both antennae 32-segmented, with 3rd segment about  $2.8 \times$  length of 4th. Forewing with cell C glabrous and with short stub of crossvein m+cu-a; hindwing with apical stub of vein 2A absent. Abdominal terga coriaceous, weakly shiny. Subgenital plate broadly rounded apically. Genitalia as in Figs 6A-C, 10A.

**Distribution.** Japan (central to western Honshu, Shikoku).

**Type material examined.** ♀ (holotype), "Hirakura [34°27'N, 136°15'E], Mie Pref., Honshu, 6.VI.1965, A. Nakanishi" "Holotype, *Acantholyda albomaculata* n. sp., Shinohara, 1985" (KU); 5 ♀ (paratypes, one shown in Fig. 1K-L) from Yamanashi, Nagano, Hyogo, and Kochi Prefectures listed by Shinohara (1985).

**Other material examined.** Honshu—Nagano Pref.: 1 ♀, Yarisawa, 1600–1900 m, Kamikōchi, Azumi village, 18–22.VII.1989, A. Shinohara; 1 ♀, same data except for 30.VII.1990. Yamanashi Pref.: 1 ♀, "Fuji-rindō, 8.VII.1983, K. Emoto"; 1 ♂ (Figs 2F, 4A-B, 6A-C, 10A), "Hatchōdaira, Mt. Kinpuzan, 20.VII.1985, S. Tsuyuki." Nara Pref.: 1 ♂, "Mt. Ohdaigahara, Nara Pref., 7.VI.1985, T. Naito" (KU); 1 ♀, "Ohdaigahara, Tozanguchi, 3.V.1988, H. Kumamoto."

**Variation.** The female of this species is rather variable as I noted in 1985, based on a study of six specimens of the type series. With the exception of a specimen from Nara Prefecture, which will be discussed below, the additional specimens listed above show color variations within the range I gave. In the size and number of antennal segments, the three specimens (length 10–11.5 mm; antennae 29- or 30-segmented, with the third segment about 2.5–2.8× the length of the fourth) differ little from the type series (length 10.5–11.5 mm; antennae with 30 to 35 segments, with the third segment about 2.3–3.2× the length of the fourth). Cell C in the forewing is always glabrous; the stub of crossvein m+cu-a in the forewing is sometimes present but very short; and the stub of vein 2A in the hindwing is sometimes present but very small.

A female specimen from Nara Prefecture differs from the other known specimens as follows: antenna with only 4th to 8th segments creamy white (outer surface of these segments more or less darkened); head with surface microsculpture very shallow, with wide smooth areas; facial crest flat and antennal furrow shallow; and forewing entirely blackish infuscated. It is 10 mm long and the antenna has 31 segments, with the third segment about 2.7 times as long as the fourth. Cell C in the forewing of this specimen is glabrous, the stub of crossvein m+cu-a in the forewing is bud-like, nearly absent, and the stub of vein 2A in the hindwing is present but very short on one wing and absent on the other. This specimen possibly represents a separate, undescribed species, but, because of the paucity of material of *A. albomaculata* (only ten females and two males available) and the rather wide range of variation it shows, I prefer for now to regard the Nara specimen as a somewhat aberrant specimen of *A. albomaculata*.

Only two males have been available for study, one of which is described above. Another specimen, from Mt. Ohdaigahara, has the pale area on the antenna somewhat darkened, the mandibles largely dark brownish, the fore tibiae brown, not blackish, the abdomen entirely black, and both the antennae 31-segmented, with the third segment about 2.9 times as long as the fourth; otherwise it agrees with the description above.

**Host plant.** Unknown.

**Remarks.** This black and creamy-white species is well characterized by its peculiar coloration. Particularly, the black antenna with creamy-white median segments, entirely blackish legs and stigma, and black abdomen with creamy-white lateral margins in the female (Fig. 1K-L), and the same coloration of the antenna, legs (except for the brownish fore and mid tibiae and tarsi), and stigma in the male (Fig. 4A-B) help to distinguish *A. albomaculata* from its Japanese congeners.

***Acantholyda (Itycorsia) iwatai* Takeuchi, 1938**

(Figs 4C-F, 5A-B, 6D-F, 10B)

*Acantholyda iwatai* Takeuchi, 1938: 210; Takeuchi 1955: 113, pl. 51, 744; Abe and Togashi 1989: 541.

**Male** (hitherto undescribed; description based on a specimen from Fuji-rindô, Fig. 4E-F). Length about 11 mm. Head black, with pale yellow mark in ventral part of para-antennal field (Fig. 5B); mandible pale brown, becoming dark ferruginous towards apex; antenna pale brown, becoming blackish towards apex, with large black mark on dorsum of scape. Thorax entirely black. Legs black, with apices of femora, and entire tibiae and tarsi, pale brown. Wings uniformly and rather strongly infuscated; stigma and veins blackish brown. Abdomen black, with round, pale yellow spot at apex of subgenital plate; genitalia blackish brown, with apical third of harpes pale brown.

Head with transverse suture rather distinct; lateral transverse and coronal sutures indistinct; frons nearly flattened, without distinct median crest; frontal tubercle low, rounded, lying between antennal sockets; ocellar basin small and rather shallow, with anterior and posterior furrow-like extensions; median fovea small, punctiform; facial crest weakly raised, rounded; clypeus weakly roundly swollen medially, about as high as frontal tubercle in lateral view. Head dull, densely punctate and pilose; upper part behind transverse and lateral transverse sutures and clypeus with interspaces between punctures rather wide and smooth; para-antennal field with narrow ventral part impunctate.

Both antennae 30-segmented, with 3rd segment about  $2.5 \times$  length of 4th. Forewing with cell C very sparsely pilose and stub of crossvein m+cu-a absent; hindwing lacking apical stub of vein 2A. Abdominal terga rather weakly coriaceous, shiny. Subgenital plate rounded apically. Genitalia as in Figs 6D-F, 10B.

**Distribution.** Japan (northern to central Honshu, Shikoku [new record], Kyushu [new record]).

**Type material examined.** ♀ (holotype), "7.VI.1929, Shimajima [Nagano Pref., 36°13'N, 137°41'E], Takeuchi" "Acantholyda iwatai Take., Holotype" (UOP; covered with dead mold); 1 ♀ (paratype, Fig. 5A), "Japan, Alp, Loc. Yarisawa, Date July 21

1932, Coll. K. Iwata" "*Acantholyda iwatai* Take., Paratype" (UOP).

**Other material examined.** Honshu—Aomori Pref.: 1 ♂, "Hakkouda-IS (Aomori), Jul. 17, 1997, M. Yamada" (MY). Tochigi Pref.: 1 ♂, "Nikko, Chûzenji-kohan, 1936.7.5." Yamanashi Pref.: 1 ♀, 2 ♂ (one shown in Figs 5B, 6D–F, 10B), "Fuji-rindô, 8.VII.1983, K. Emoto"; 1 ♀ (Fig. 4C–D), "Mt. Kinpuzan, 13.VII.1980, S. Tsuyuki"; 1 ♂, Masutomi-kôsen, Sudama town, 6.VIII.1986, A. Shinohara. Nagano Pref.: 1 ♂, "Kamikôchi, 20.VI.1951, T. Nakane" (UOP); 1 ♀, same data except for 21.VI.1951 (UOP); 1 ♀, Tokusawa, 1600 m, Kamikôchi, Azumi village, 21.VII.1968, A. Shinohara; 3 ♀, same data except for 4–6.VII.1989; 1 ♂ (Fig. 4E–F), "Tokugô, 13.VI.1939, K. Takeuchi" (UOP); 1 ♂, "Shimashima-dani, 19.Jul.1969, S. Ohkusa"; 1 ♂, "Shinano, Shimashima, 1915.VII.19"; 1 ♀, Minoto, ca. 1900 m, Yatsugatake Mts, Chino city, 25.VII.1980, A. Shinohara. Aichi Pref.: 1 ♂, "Shidara-cho, Uradani, 7.VI.1994, S. Hashimoto." Shikoku—Tokushima Pref.: 1 ♂, "Mt. Tsurugi, 24.VII.1970, T. Tano." Kyushu—Kagoshima Pref.: 1 ♂, "Mt. Kirishima, 16.V.1957, H. Nagase"; 1 ♂, "Takachihonomine, Mt. Kirishimayama, VI.10.1958, Y. Takemura."

**Variation.** The ten females examined, all from central Honshu, range in length from 10 to 12 mm but they are quite similar in coloration. Seventeen intact antennae of nine females have 26 (one antenna), 28 (three), 29 (three), 30 (two), 31 (two), and 32 (six) segments; the third segment is about 2.4–2.6 times as long as the fourth in ten specimens. The antennae of the holotype are 26- and 29-segmented (those of the paratype are broken at their apices), although Takeuchi (1938: 210) noted "antennae 27-segmented" in the original description. Cell C in the forewing is glabrous or very sparsely pilose, the stub of crossvein  $m+cu-a$  in the forewing is always absent, and a very short stub of vein 2A in the hindwing is present in one or two specimens.

The 13 males examined vary in length from 9.5 to 11 mm. Three males from Aomori, Shikoku, and Kyushu have a large pale yellow marking on the clypeus; the Aomori specimen has almost entirely pale yellow clypeus and small paired pale yellow spots on the mesoscutal median lobe. The anterior surface of each femur, particularly that of the fore leg, is often largely pale brown. The basal halves of the wings are sometimes more weakly infuscated than the apical halves. The stigma has a pale brown marking in the apical half in two specimens, one from Aichi Prefecture and the other from Shikoku. The subgenital plate is entirely black in all males except for a specimen from Aomori, two specimens from Fuji-rindô, and a specimen from Shikoku. Fifteen intact antennae of ten males have 30 (three antennae), 31 (two), 32 (six), 33 (three), and 35 (one) segments; the third segment is about 2.4–2.8 times as long as the fourth in 13 specimens. Cell C in the forewing is always pilose, though sometimes very sparsely so; the stub of crossvein  $m+cu-a$  in the forewing is usually absent, but a very short stub is sometimes present; and the stub of vein 2A in the hindwing is absent, but in one specimen it is faintly indicated.

**Host plant.** Unknown.

**Remarks.** This is a very dark-colored species; in the female, the head capsule, thorax, and abdomen are entirely black, except for the pale yellow mesoscutal median lobe and mesoscutellum (Figs 4C–D, 5A), and in the male, the head capsule, thorax, and abdomen are entirely black, except that the para-antennal fields are marked with pale yellow (sometimes the clypeus and subgenital plate also have pale marks) (Figs 4E–F, 5B). All the other species of *Itycorsia* known from Japan

Webspinning sawfly genus *Acantholyda* of Japan

41

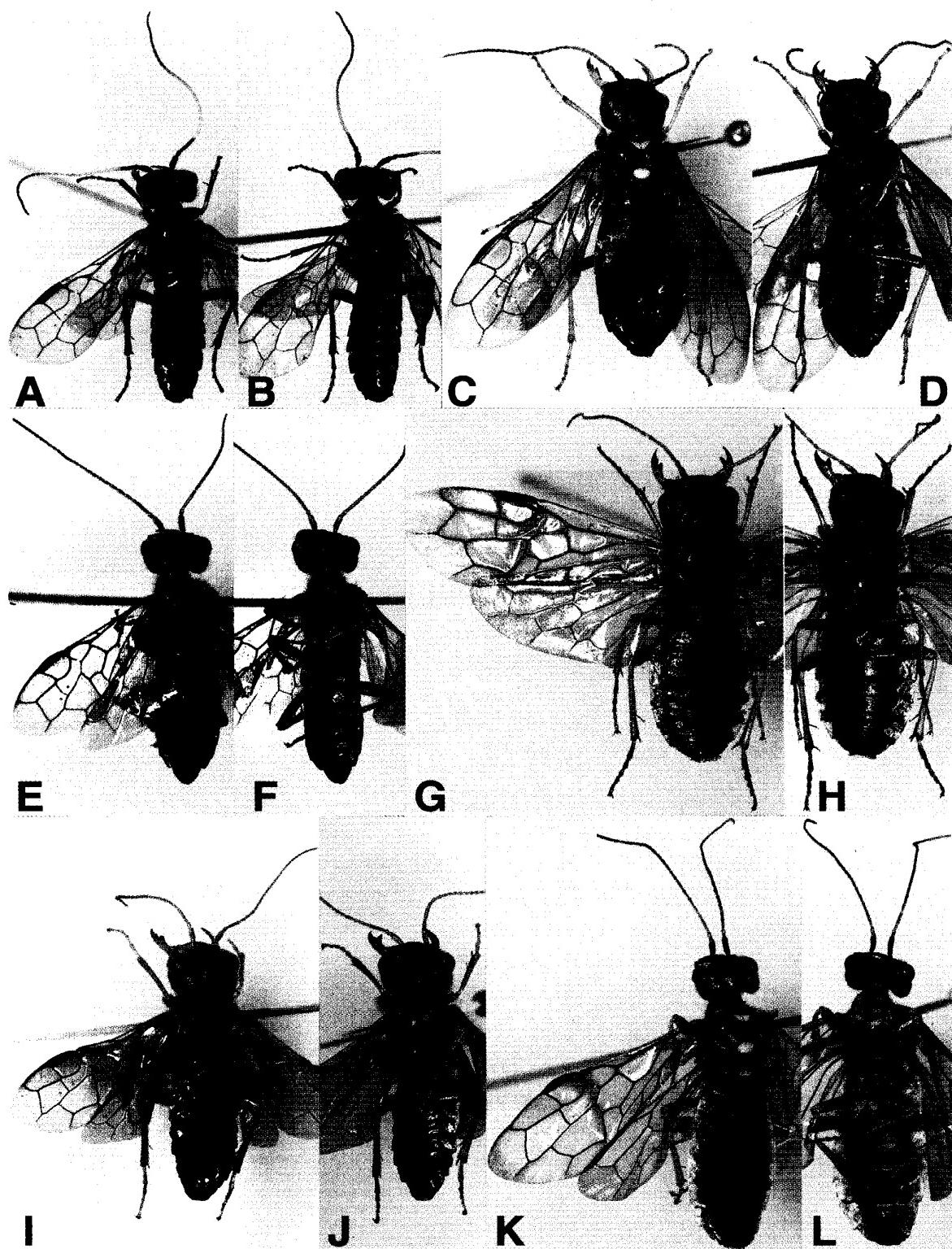


Fig. 4. *Acantholyda* spp., Dorsal (A, C, E, G, I, K) and ventral (B, D, F, H, J, L) views. A-B, *A. albomaculata*, ♂, Mt. Kinpuzan, Yamanashi Pref., length about 10mm; C-D, *A. iwatai*, ♀, Mt. Kinpuzan, Yamanashi Pref., length about 11 mm; E-F, do., ♂, Tokugô, Nagano Pref., length about 10.5 mm; G-H, *A. mizunoi*, ♀, holotype, length about 12 mm; I-J, do., ♂, paratype, Masutomi-kôsen, Yamanashi Pref., length about 11 mm; K-L, *A. tsuyukii*, ♀, holotype, length about 11 mm.

have the abdomen at least laterally pale-colored, except perhaps for the somewhat confusing cases in the males of *A. albomaculata* and *A. mizunoi*. The male of *A. albomaculata* may also have an almost entirely black head, thorax, and abdomen, but its bicolored antenna and the blackish tibiae and tarsi are quite distinctive (compare Fig. 4A–B and E–F). The males of *A. iwatai* and *A. mizunoi* are easily separable by the characters given in the key.

Takeuchi (1938: 211) noted that the holotype of this species was collected at “Tokugo-toge, near Kamikochi,” whereas the specimen labeled holotype in Takeuchi’s collection has been labeled “Shimajima, Takeuchi.” This simply suggests that the specimen was collected along the path on the eastern slope of Tokugo-toge (pass) leading to the valley of Shimashima (=Shimajima).

***Acantholyda (Itycorsia) mizunoi* sp. nov.**  
(Figs 3B, 4G–J, 5C–D, 9A–C, 10C)

**Female** (holotype, Fig. 4G–H). Length about 12 mm. Head black, with pale yellow marking as in Fig. 5C; upper part of gena with large but obscure, pale brownish marking; mandible pale brown, becoming dark ferruginous towards apex; antenna pale brown, becoming blackish towards apex. Thorax black, with tegula, most of mesoscutellum, and very narrow anterior margin of mesepisternum pale yellow. Legs black, with apices of femora, and entire tibiae and tarsi, pale brown. Wings with basal halves weakly and apical halves strongly infuscated; stigma blackish brown; veins dark brown, with veins C and Sc pale brown, and veins in strongly infuscated part blackish. Abdomen black, with lateral margins of dorsum, broad posterior margin of last tergum, and entire laterotergites pale brown.

Head with sharp postgenal carina laterally; vertex (postocellar area) about 0.93 times as long as anterior width; transverse, lateral transverse, and coronal sutures indistinct; frons weakly raised, with rather low median crest running from place of median fovea to interantennal area (frontal tubercle); ocellar basin very small and shallow, posteriorly indistinct; median fovea indistinct; facial crest weakly raised, very bluntly carinate; clypeus roundly swollen medially, about as high as frontal tubercle in lateral view. Head behind level of transverse and lateral transverse sutures and upper part of gena with narrowly spaced, usually medium-sized, distinct punctures, interspaces rather smooth; area from level of lateral transverse suture to facial crest and frons with very dense, partly confluent punctures, lateral part of the area more or less rugose; top of interantennal crest smooth; dorsal third to half of para-antennal field covered with dense, rather small punctures, but remaining part smooth, without distinct punctures (Fig. 3B); clypeus with narrowly spaced, small to medium-sized punctures, interspaces rather smooth; dorsolateral part of clypeus weakly transversely rugose; lower part of gena coarsely and irregularly rugose. Punctures on head bearing long, dark-colored setae.

Right antenna 35-segmented (left one with apex missing); 3rd segment about 2.4× length of 4th. Forewing with cell C glabrous and stub of crossvein m+cu-a absent; hindwing lacking apical stub of 2A. Abdominal terga shallowly coriaceous, weakly shiny.

**Male** (paratype from Masutomi-kōsen, Fig. 4I–J). Length about 11 mm. Head black, with pale yellow markings as in Fig. 5D; mandible pale brown, becoming

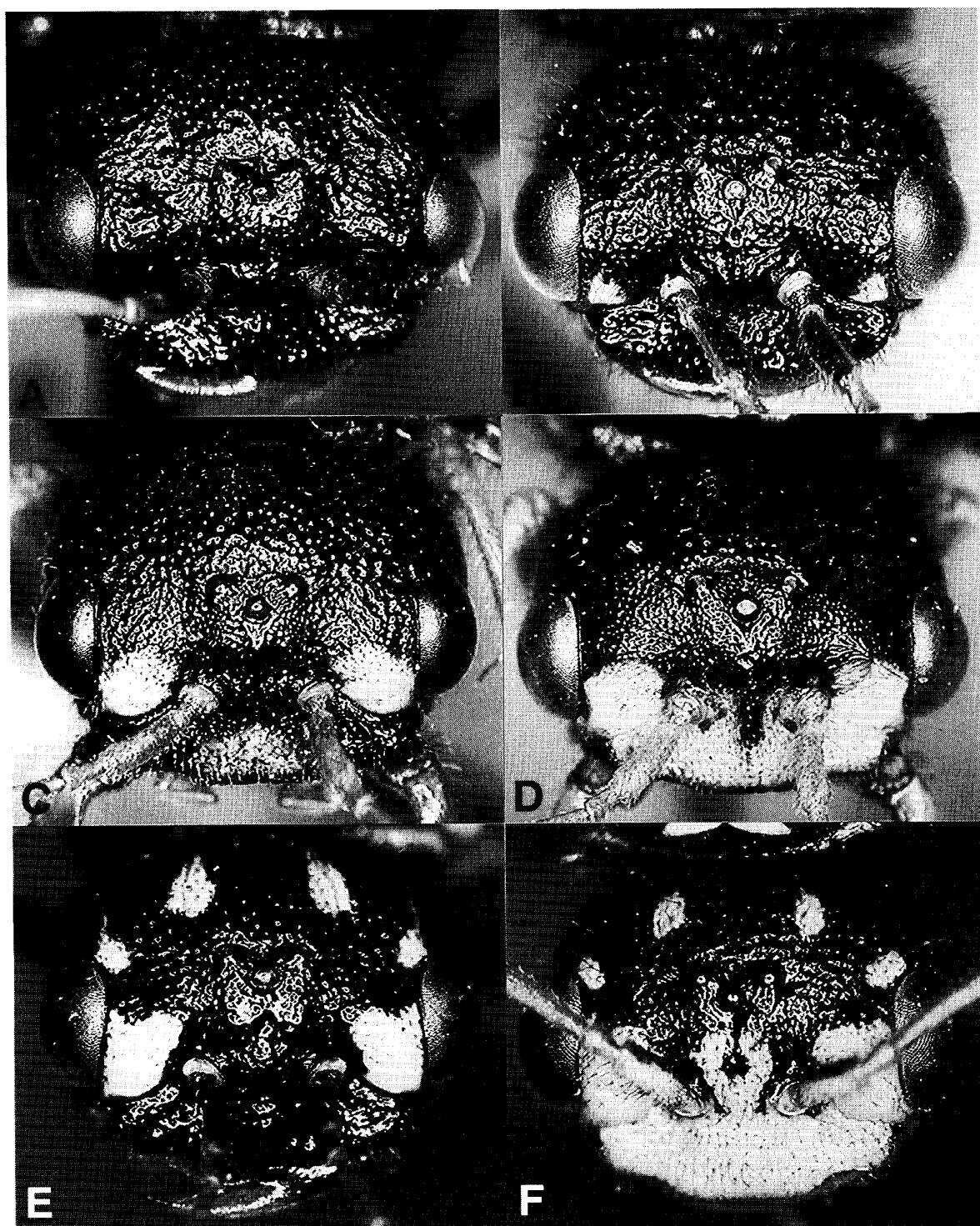


Fig. 5. *Acantholyda* spp., heads, dorsofrontal views, A, *A. iwatai*, ♀, paratype, Yarisawa, Nagano Pref., width about 3.0 mm; B, do., ♂, Fuji-rindō, Yamanashi Pref., width about 2.9 mm; C, *A. mizunoi*, ♀, holotype, width about 3.3 mm; D, do., ♂, paratype, Masutomi-kōsen, Yamanashi Pref., width about 3.3 mm; E, *A. tsuyukii*, ♀, holotype, width about 3.0 mm; F, do., ♂, topotypic paratype, width about 2.7 mm.

dark ferruginous towards apex; antenna pale brown, becoming blackish towards apex. Thorax black; tegula blackish brown to black. Legs black, with apices of femora, and entire tibiae and tarsi, pale brown. Wings uniformly strongly infuscated; stigma blackish brown; veins blackish brown, with veins C and Sc pale brown. Abdomen black, with very narrow lateral margins obscurely pale brown and narrow apex of subgenital plate pale yellow; genitalia brown, more or less blackish ventrally.

Head with transverse suture distinct laterally; lateral transverse and coronal sutures indistinct; frons weakly raised, with median crest running, without interruption at epistomal suture, from place of median fovea to anterior part of clypeus; ocellar basin small but distinct, with anterior and posterior furrow-like extensions; median fovea indistinct; facial crest weakly raised; clypeus roundly swollen medially, about as high as frontal tubercle in lateral view. Punctuation and pilosity of head as in female, but para-antennal field with dorsal half to two-thirds punctate and top of interantennal (frontoclypeal) crest punctate.

Right antenna 32-segmented (left one malformed); 3rd segment about 2.2× length of 4th. Forewing with cell C glabrous and stub of crossvein m+cu-a absent; hindwing lacking apical stub of vein 2A. Abdominal terga generally smooth, shiny. Subgenital plate rounded apically. Genitalia as in Figs 9A–C, 10C.

**Distribution.** Japan (central Honshu).

**Type series.** Holotype: ♀ (Figs 3B, 4G–H, 5C), Suzurikawa [36°40'N, 138°30'E], 1800 m, Shiga-kōgen Nagano Pref., 7.VIII.1984, A. Shinohara. Paratypes: Tochigi Pref.: 1 ♂, "Mt. Nantai, Nikko, 19.VII.1983, K. Nakamura." Yamanashi Pref.: 1 ♀, "Misakayama, Kawaguchiko-machi, 18.VI.1988, K. Mizuno"; 1 ♂ (Figs 4I–J, 5D, 9A–C, 10C), Masutomi-kōsen, Sudama town, 24.VII.1979, A. Shinohara. Nagano Pref.: 1 ♂, Mt. Yokoteyama, 2000 m, Shiga-kōgen, larva on *Tsuga diversifolia* collected 16.VIII.1987, entered soil 24.VIII, adult emerged 15.V.1988, H. Kojima; 1 ♀, Shimashima-dani, Azumi village, 26.VII.1969, A. Shinohara; 1 ♀, Minoto, 1800–2000 m, Yatsugatake Mts, Chino city, 31.VII.1986, A. Shinohara.

**Variation.** The four females examined range in length from 12 to 13 mm and vary in coloration as follows: the pale marking on the clypeus is obsolete in the paratypes from Minoto and Mt. Misakayama; a small pale spot exists on the upper inner orbit in a paratype from Shimashima-dani; the antennal scape is largely blackish in a paratype from Mt. Misakayama; and the posterior margin of each sternum is marked with pale yellow in a paratype from Shimashima-dani. Four intact antennae of three paratypes have 33 (one antenna) or 34 (three antennae) segments, with the third segment about 2.3–2.4 times as long as the fourth. Cell C in the forewing is always glabrous, and the stub of crossvein m+cu-a in the forewing and the stub of vein 2A in the hindwing are always absent.

All three males examined are 11 mm long and show color variation as follows: in the reared specimen from Mt. Yokoteyama, the tegula is pale brown, basally blackish, and the narrow lateral margins of the dorsum, each laterotergite (inner half largely darkened), narrow posteromedian parts of the fourth to seventh sterna, and the entire subgenital plate are pale brown; in the specimen from Mt. Nantaisan, the tegula is dark brown with a blackish margin while the abdominal coloration is as in the Masutomi specimen. The four intact antennae of the three specimens have 32 (three antennae) or 30 segments, with the third segment about 2.2 or 2.3 times as long as the fourth.

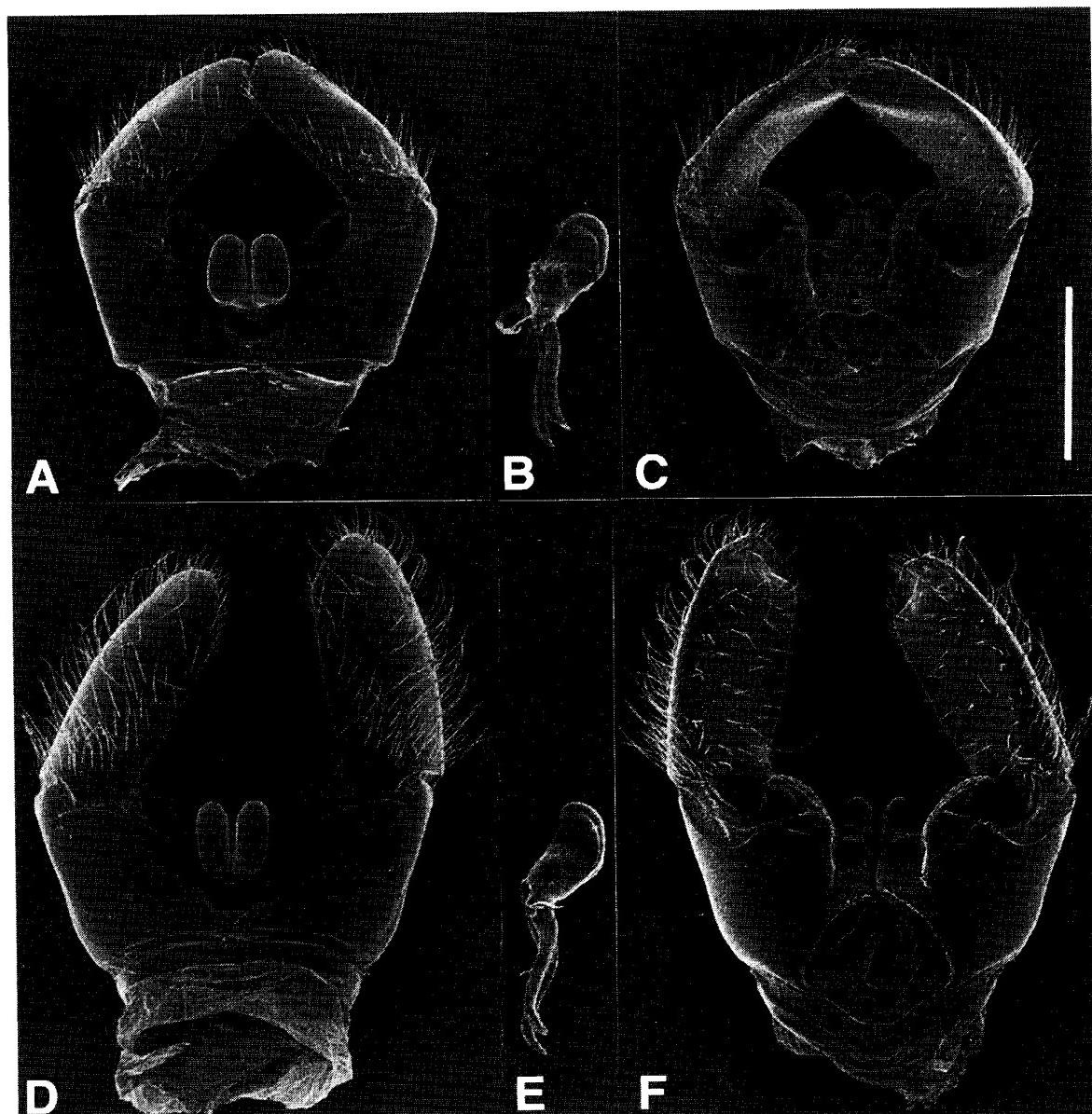


Fig. 6. Male genitalia, *Acantholyda albomaculata*, Mt. Kinpuzan, Yamanashi Pref. (A-C) and *A. iwatai*, Fuji-rindō, Yamanashi Pref. (D-F). A, D, Dorsal views; B, E, ventral views; C, F, penis valves, lateral views. Scale: 0.5 mm.

**Host plant.** *Tsuga diversifolia* (Maxim.) Mast.

**Etymology.** This new species is named in honor of Mr. K. Mizuno, Kyoto, who collected an extensive series of sawflies and generously offered them to me for my studies over the last 30 years. Though his main interest is beetles, Mr. Mizuno often takes rare specimens of sawflies, such as a paratype of this new species.

**Remarks.** This is a robust species superficially resembling *A. (I.) aglaia*. The latter species is represented by two subspecies in Japan, *A. a. yezoensis* from Hokkaido and *A. a. stigma* described below from Honshu. *Acantholyda mizunoi* is easily distinguished from both of them by the densely punctate and pilose dorsal

part of the para-antennal fields (compare Fig. 3B and E), and the entirely black median lobe of the mesoscutum (sometimes also entirely black in the male of *A. aglaia*).

In Gussakovskij's (1935) key to Palearctic species, this new species runs to *A. (I.) fumata* Enslin, 1917, known only from the holotype female from Turkey, which I have examined (see Blank *et al.* 1998). The Turkish species, however, has the head and thorax very smooth and polished between sparse, small punctures, with the para-antennal fields entirely impunctate, and its lateral pronotum, posterior part of the mesoscutal median lobe, and lateral part of the mesepisternum are largely pale yellow.

***Acantholyda (Itycorsia) tsuyukii* sp. nov.**  
(Figs 3C, 4K–L, 5E–F, 7A–B, 8A, 9D–F, 10D)

*Acantholyda laricis*: Takeuchi 1938: 209; Takeuchi 1955: 113, pl. 51, 743; Abe and Togashi 1989: 541. [Part; not Giraud 1861: 91.]

**Female** (holotype, Fig. 4K–L). Length about 11 mm. Head black, with pale yellow markings as in Fig. 5E; lower part of gena with large pale yellow mark; mandible pale brown, becoming dark ferruginous towards apex, with large but obscure, blackish brown mark basally; antenna pale brown, becoming blackish towards apex; most of scape and base of pedicel black. Thorax black, with following parts pale yellow: posterior margin (medially interrupted) and ventral margin of lateral part of pronotum, spot on ventral surface of cervical sclerite, tegula, posterior half of mesoscutal median lobe, posterior oblong spot on each mesoscutal lateral lobe, most of mesoscutellum, large anterior and median spots on mesepisternum, very narrow posterior margin of mesepimeron, metascutellum, anterior and posteromedian spots on metepisternum, and anterior spot and posterior margin of metepimeron. Legs pale yellow, with base and dorsal (posterior) surface of each coxa, most of each trochanter, and base and dorsal (posterior) and anterior surfaces of each femur (except at apex of each) black. Wings subhyaline, stained with blackish brown; forewing with distinct blackish band below stigma and along outer margin; stigma and veins blackish brown, with veins C and Sc paler. Abdomen black, very faintly purplish, with lateral margin of dorsum, entire laterotergites, and narrow posterior margin of each sternum pale yellow.

Head with sharp postgenal carina laterally; vertex (postocellar area) about 0.94 times as long as anterior width; transverse suture recognizable; lateral transverse and coronal sutures indistinct; frons weakly raised; ocellar basin small and shallow; median fovea punctiform, shallow; facial crest rather strongly raised, bluntly carinate; frontal tubercle low but distinct between antennae; clypeus roundly swollen medially, about as high as frontal tubercle in lateral view. Head behind level of transverse and lateral transverse sutures and upper part of gena with rather widely spaced, usually large, distinct punctures, interspaces smooth; area from level of lateral transverse suture to facial crest and frons with dense, partly confluent punctures, lateral part of the area very weakly rugose; median part of frons in front of median ocellus more sparsely punctured; dorsal third to half of para-antennal field covered with sparse but distinct punctures, remaining part

smooth, without distinct punctures (Fig. 3C); clypeus with widely spaced, small to medium-sized punctures, interspaces rather smooth; lower part of gena coarsely and irregularly rugose. Punctures on head bearing blackish setae.

Both antennae 29-segmented; 3rd segment about  $2.1 \times$  length of 4th. Forewing with cell C pilose and stub of crossvein m+cu-a absent; hindwing lacking apical stub of vein 2A. Abdominal terga rather heavily coriaceous, weakly shiny.

**Male** (topotypic paratype, Fig. 7A–B). Length about 9.5 mm. Head black, with pale yellow markings as in Fig. 5F; lower part of gena with large pale yellow mark; mandible pale brown, becoming dark ferruginous towards apex; antenna pale brown, becoming blackish towards apex, with scape and pedicel pale yellow, dorsal surface of scape black. Thorax black, with following parts pale yellow: posterior margin (medially interrupted) of dorsal part and ventral margin of lateral part of pronotum, fading spot on ventral surface of cervical sclerite, tegula, posterior half of mesoscutal median lobe, mesoscutellum, large anterior and median spots on mesepisternum, very narrow posterior margin of mesepimeron, metascutellum, anterior and posteromedian spots on metepisternum, and anterior spot and very narrow posterior margin of metepimeron. Legs pale yellow, with base and dorsal (posterior) surface of each coxa, each trochanter (except on ventral surface), and dorsal (posterior) surface of each femur (except at apex of each) black. Wings rather strongly stained with blackish brown; forewing with obscure blackish band below stigma; stigma blackish brown with basal half pale brown; veins blackish brown, with veins C and Sc pale brown. Abdomen black, with lateral margin of dorsum, laterotergites (4th to 6th with obscure blackish marks medially), posterior margin of each sternum, and most of subgenital plate pale yellow.

Head with transverse, lateral transverse, and coronal sutures indistinct; frons very weakly raised, with low crest (frontal tubercle) between antennae; ocellar basin small but distinct, with anterior and posterior notch-like extensions; median fovea indistinct; facial crest rather strongly raised, rounded or very bluntly carinate; clypeus roundly swollen medially, about as high as frontal tubercle in lateral view. Punctuation and pilosity of head as in female, but para-antennal field with dorsal half to two-thirds punctate and frons in front of median ocellus coarsely punctate, somewhat rugose.

Both antenna 32-segmented; 3rd segment about  $2.8 \times$  length of 4th. Forewing with cell C pilose and stub of crossvein m+cu-a absent; hindwing with apical stub of vein 2A absent. Abdominal terga smooth, partly coriaceous, shiny. Subgenital plate broadly rounded apically. Genitalia as in Figs 9D–F, 10D.

**Distribution.** Japan (central Honshu, Shikoku).

**Type series.** Holotype: ♀ (Figs 3C, 4K–L, 5E), Minoto [35°58'N, 138°19'E], 1800–2000 m, Yatsugatake Mts, Chino city, Nagano Pref., 6.VIII.1982, A. Shinohara. Paratypes: Honshu—Tochigi Pref.: 1 ♀, “Nikko, 17.VII.1957, Y. Kurosawa”; 2 ♀, “8.VIII.1934, Yumoto, Nikko, Takeuchi/Issiki” “*Acantholyda laricis* Giraud, det. Takeuchi” (KU); 1 ♀, “Yumoto, Nikko, 20.VII.1935, A. Yoshida”; 1 ♀, “Konsei-tōge, 29.VII.1935, K. Tsuneki”; 1 ♀, “Botanical Garden, Tokyo Univ., Nikko, 18–V–1997, K. Nakamura” (KN). Gunma/Nagano Prefs: 1 ♀, Mt. Kenashiyama, 1930 m, ca. 23 km east of Nagano city, on *Tsuga diversifolia*, 25.VII.1998, H. Kojima. Yamanashi Pref.: 1 ♂, “M. [South] Alps, Kitazawa, 27.7.1932, H. Masuda” (UOP); 1 ♀, “Kitazawa, South Alps, 5.8.1936, H. Masuda” (UOP); 2 ♀, “Hatchōdaira, Mt. Kinpuzan, 20.VII.1985, S. Tsuyuki”; 1 ♀, “Gozaiishi-Hō-goya, 1.VIII.1987, S. Tsuyuki”; 1 ♀, “Gozaiishi-kōsen,

31.VII.1995, K. Mizuno"; 1 ♀, "Okanbazawa, Mt. Kitadake, 12.VII.1979, N. Takeuchi." Yamanashi/Nagano Prefs: 1 ♀, "Mt. Senjōdake, 2.VIII.1968, R. Inomata"; 1 ♀, same data except 5.VIII.1968; 1 ♂, same data except 8.VIII.1968. Nagano Pref.: 1 ♀, Mt. Yokoteyama, 2000 m, Shiga-kōgen, larva on *Tsuga diversifolia* collected 4.IX.1988, entered soil 11.IX, adult emerged 28.V.1989, H. Kojima; 1 ♂ (Figs 9D–F, 10D), "Shiga-kōgen, 3–6.VIII.1982, M. Satō"; 1 ♀, "Kakuma, 10.VII.1931, Iijima" "N. Tosawa Collection, June, 1978" (OMNH); 1 ♂, "Kamikōchi, 21.VII.1915"; 1 ♀, "Kamikōchi, 11.VII.1919, S. Hirayama"; 1 ♀, "Kamikōchi, 15.VII.1927, K. Sato"; 1 ♀, "Kamikōchi, 1933.7.28" "laricis?" "Acantholyda." (KU); 1 ♀, "15.VIII.1936, Kamikōchi, Takeuchi" (UOP); 1 ♀, "4.VIII.1953, Kamikōchi, Takeuchi" (UOP); 1 ♀, "Kamikōchi, 1.VIII.1959, M. Miyatake" (EU); 1 ♂, "Kamikōchi-Tokugō, 31.VII.1959, M. Miyatake" (EU); 1 ♀, "Shimashima, 10.VII.1919, S. Hirayama"; 1 ♀, Shimashima-dani, Azumi village, 23.VII.1968, A. Shinohara; 1 ♀, "Shimashima-dani, 21.VII.1969, S. Ohkusa"; 1 ♂, "Kami-kurio-rindō, Minami-aiki-mura, 27.VII.1999, H. Hamaji"; 2 ♂, Tenshōjihara, Tateshina, Chino city, 29.VII.1972, A. Shinohara; 1 ♀, "Kita-Yatsugatake, 27.VII.1978, T. Nakamura"; 1 ♀, Shirakoma-ike, 2100 m, Yatsugatake Mts, Minamimaki village, 27.VII.1998, T. Shinohara; 2 ♀, "Mugikusa-tōge, Yatsugatake Mts, 20.VII.1997, S. Tsuyuki"; 1 ♂, same data as for holotype except 23.VII.1970; 1 ♀, same data except 26.VII.1980; 2 ♂ (one shown in Fig. 8A), same data except 30.VII.1982; 8 ♀, 1 ♂ (Figs 5F, 7A–B), same data except 5–7.VIII.1982; 2 ♀, same data except 29.VII.–3.VIII.1986; 2 ♀, same data except 4–8.VIII.1987; 1 ♀, same data except 4–8.VIII.1988; 1 ♀, same data except 6–9.VIII.1991; 2 ♀, 2 ♂, same data except 23–26.VII.1996; 1 ♀, same data except 31.VII.1997; 1 ♀, 2 ♂, same data except 27–31.VII.1999; 1 ♀, Tanohara, 2200 m, Mt. Ontakesan, larva on *Tsuga diversifolia* collected 30.VIII.1994, adult emerged 13.VII.1995, H. Kojima. Gifu Pref.: 1 ♀, 1 ♂, "Sengendaru, Mt. Ontakesan, 2.VIII.1966, T. Okutani" (KU). Nara Pref.: 4 ♂, "Mt. Ohdaigahara, 7.VI.1985, T. Naito" (KU).

**Other material examined.** Honshu—Tochigi Pref.: 1 ♀, "Konsei-tōge, Nikko, 8.VIII.1969, T. Saito". Nagano Pref.: 1 ♂, Tanohara, 2200 m, Mt. Ontakesan, larva on *Tsuga diversifolia* collected 11.IX.1993, entered soil 17.IX, adult found dead broken in soil II.2000, H. Kojima (heavily damaged). Shikoku—Ehime Pref.: 1 ♀, "Omogokei, 17.V.1952, T. Edashige" "Acantholyda (Itycorsia) laricis Giraud, 1861, det. S. Ueda, '54" (EU).

**Variation.** The 52 females in the type series vary in length from 8 to 13 mm. They are variable in coloration. Very pale specimens have the following parts of the head and thorax pale yellow: median mark on clypeus, entire para-antennal field, paired spots on frons, supraocular stripe, large mark along lateral suture, large mark on gena extending up to posterior end of supraocular stripe, ventral margin of lateral pronotum, dorsal posterior margin of pronotum (medially interrupted), large spot on cervical sclerite, tegula, posterior half of mesoscutal median lobe, spot on posterior part of mesoscutal lateral lobe, mesoscutellum, broad anterior margin and large spot on posteromedian part of mesepisternum, metascutellum, and anterior corner and large spot on posterior part of metepisternum. Very dark specimens, on the other hand, have only the para-antennal field (rarely this also becomes blackish), tegula, posterior part of the mesoscutal median lobe, mesoscutellum, and anterior margin of the mesepisternum pale yellow on the head and thorax. The usually distinct dark band below the stigma in the forewing is sometimes obsolete, and the stigma often has the apical part (up to half) pale

brown. Seventy-nine intact antennae of 47 females have 27 (one antenna), 28 (six), 29 (14), 30 (11), 31 (18), 32 (11), 33 (eight), 34 (seven), and 35 (three) segments; the third segment is about 1.9–2.8 times as long as the fourth in 51 specimens (2.1–2.6 in 49 specimens). Cell C in the forewing is always pilose, though sometimes very sparsely. The stub of crossvein m+cu-a in the forewing is usually missing, and very short if present. The stub of vein 2A in the hindwing is present only in a few seemingly abnormal specimens.

The two females recorded in the “*Other material examined*” section above are exceptional. The Konsei-tôge specimen is small (9 mm long) and extremely dark. Its head and thorax are entirely black except for a large pale mark on the mesoscutellum. The antennal flagellum and tegula are blackish brown, the tibiae and tarsi are somewhat darkened, the apical third of the stigma is pale brown posteriorly, the lateral margins of the abdominal venter are very narrowly pale yellow, and the laterotergites are partly blackish. Both the antennae are 24-segmented, with the third segment about 2.1 times as long as the fourth. Cell C in the forewing is pilose, and the stub of crossvein m+cu-a in the forewing and the stub of vein 2A in the hindwing are absent. With its very dark-colored tegula and entirely black mesoscutal median lobe, this specimen would not run to *A. tsuyukii* in my key above; it goes to couplet 4 but does not fit either of the two species included therein. In other characters, however, it agrees with *A. tsuyukii*, and I regard the specimen as a very dark, somewhat aberrant specimen of this species.

Another female from Omogokei, the only specimen from Shikoku, is a large specimen (12 mm long) with a very pale-colored abdomen. In the coloration of the head and thorax it is similar to a normal specimen from Honshu, with the following parts pale yellow: para-antennal field, supraocular spot, large mark along lateral suture, narrow dorsal posterior margin of pronotum (medially interrupted), tegula, posterior half of mesoscutal median lobe, small spot on posterior part of mesoscutal lateral lobe, mesoscutellum, broad anterior margin of mesepisternum, metascutellum, and anterior corner of metepisternum. The abdomen of this specimen is largely pale brown above; the first and the fifth to eighth segments are blackish brown with rather broad, pale brown lateral margins, and the second to fourth segments have the blackish part much reduced, with only a narrow median black part. In this character, therefore, the Shikoku specimen is distinguishable from the Honshu specimens examined (the type series), which always have a dark-colored abdomen, and it may be reasonable to treat the Shikoku populations as a separate subspecies if the pale coloration is found to be characteristic of these populations. The apices of the antennae of the Shikoku specimen are missing. The third antennal segment of this specimen is about 2.9 times as long as the fourth, which is also outside the relative length range of the known Honshu specimens (2.1–2.8, see above). Cell C in the forewing is very sparsely pilose, the stub of crossvein m+cu-a in the forewing is present but very short, and the stub of vein 2A in the hindwing is absent.

The 15 males examined, all from higher mountains of central Honshu, vary in length from 9 to 10.5 mm and show extensive variation in color pattern. Very pale specimens (cf. Fig. 5F) have the following parts pale yellow: clypeus, most of frons, para-antennal field, supraocular stripe, large spot along lateral suture, most of gena, broad posterior margin of pronotum (medially interrupted), lateral part of pronotum, most of cervical sclerite, tegula, posterior half of mesoscutal median

lobe, large subtriangular spot on posterior part of mesoscutal lateral lobe, mesoscutellum, most of mesepisternum, metascutellum, most of metepisternum, rather broad lateral margins of venter of abdomen, all laterotergites, and most of each abdominal sternum including subgenital plate. The apical third of the stigma and veins C and Sc are pale brown or yellowish. Very dark specimens (cf. Fig. 8A), on the other hand, have only the following areas pale yellow: clypeus, lower part of frons, para-antennal field, oblong spot along outer orbit, tegula, very small spots on mesoscutal median lobe, mesoscutellum, metascutellum, very narrow lateral margin of venter of abdomen, outer margin of each laterotergite, extremely narrow posterior margin of each sternum, and narrow posterior margin of subgenital plate. The stigma and veins C and Sc are entirely blackish brown. Other specimens are somewhere between these two extreme cases. Thirty-four intact antennae of 19 males have 28 (four antennae), 29 (two), 30 (12), 31 (five), 32 (nine), and 33 (two) segments. The third segment is about 2.1–2.8 times as long as the fourth in 21 specimens (2.2–2.6 in 19 specimens). Cell C in the forewing is always pilose, though sometimes very sparsely so; the stub of crossvein m+cu-a in the forewing is usually absent, or short if present; and the stub of vein 2A in the hindwing is always absent.

**Host plant.** *Tsuga diversifolia*.

**Etymology.** This new species is named in honor of Mr. S. Tsuyuki, Zushi city, who collected some of the paratypes. Over the last 20 years, he has collected a long series of sawflies, including many rare forms, and generously offered them to me for my studies.

**Remarks.** This new species is closely allied to *A. iwatai* from Honshu, Shikoku, and Kyushu but has a much paler color pattern. As noted above, *A. tsuyukii* is variable in coloration, but even the darkest female of this species is distinguished from that of *A. iwatai* by the pale para-antennal field (this rarely becomes blackish), tegula, anterior margin of the mesepisternum, and lateral margins of the abdomen (Figs 4K–L, 5E). The male of *A. tsuyukii* has at least the clypeus, lower part of the frons, gena, tegula, mesoscutal median lobe, mesoscutellum, metascutellum, lateral margin of the venter of the abdomen, each laterotergite, and each sternum including the subgenital plate partly or entirely pale yellow (Figs 5F, 7A, B, 8A), whereas these areas are entirely black in the male of *A. iwatai* (though the clypeus is rarely marked with pale yellow, Figs 4E–F, 5B).

In the existing keys to Asian *Acantholyda* (Gussakovskij 1935; Takeuchi 1938; Xiao *et al.* 1992), this new species would go to *A. laricis* or *A. fumata*, but these two species differ from *A. tsuyukii* in having entirely smooth, impunctate, and glabrous para-antennal fields. Three female and one male paratypes of this new species were identified as *A. laricis* by Takeuchi (1938), who first recorded the latter species from Japan based on these specimens (see also Shinohara 1997).

***Acantholyda (Itycorsia) flaviventris* Shinohara, 1991**  
(Figs 3D, 7C–D, 8B)

*Acantholyda flaviventris* Shinohara, 1991b: 65.

**Distribution.** Japan (central Honshu).

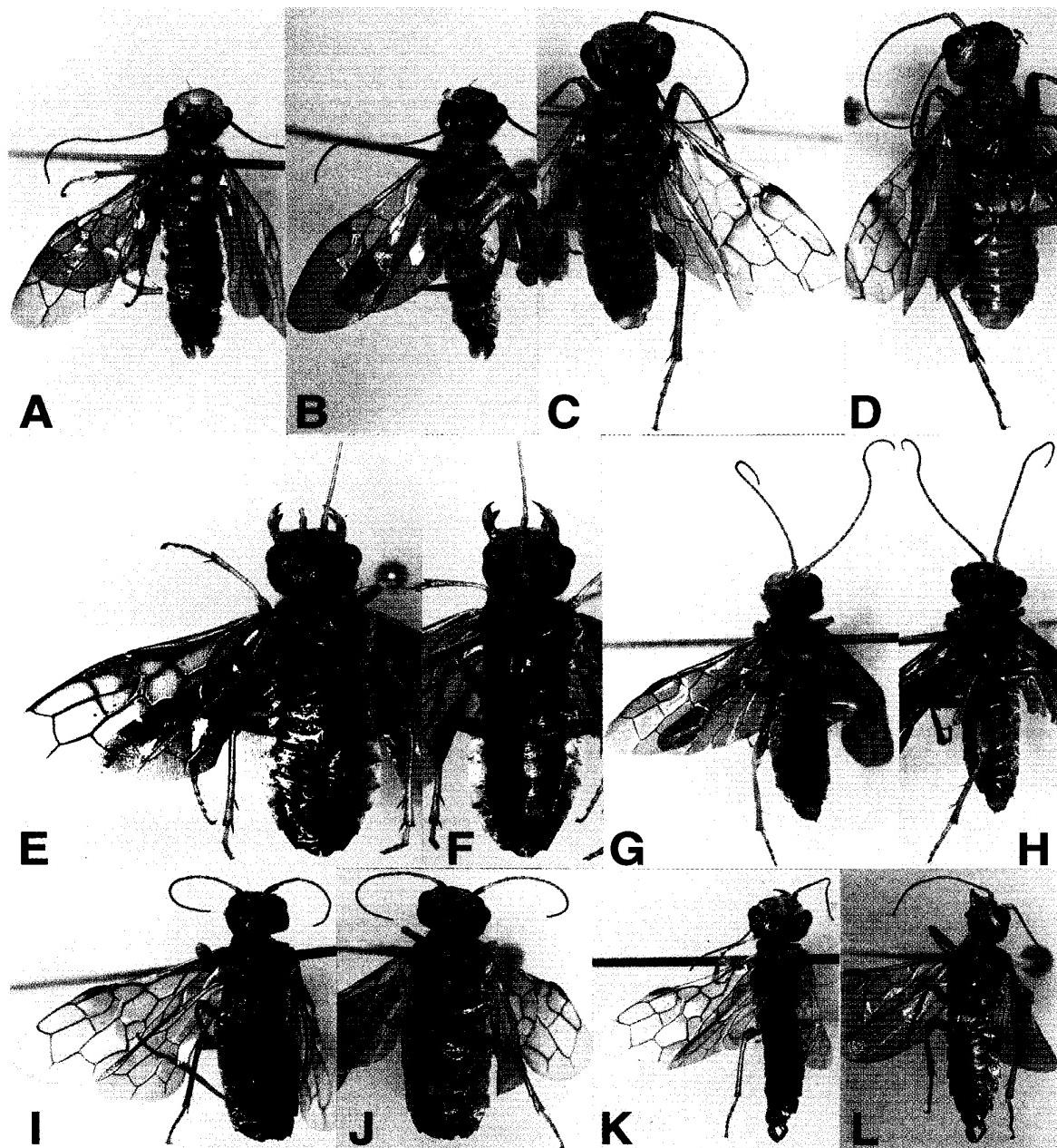


Fig. 7. *Acantholyda* spp., dorsal (A, C, E, G, I, K) and ventral (B, D, F, H, J, L) views. A–B, *A. tsuyukii*, ♂, topotypic paratype, length about 9.5 mm; C–D, *A. flaviventris*, ♂, holotype, length about 11.5 mm; E–F, *A. aglaia stigma*, ♀, holotype, length about 12.5 mm; G–H, ♂, paratype, Shiojiri city, Nagano Pref., length about 9.5 mm; I–J, *A. laricis*, ♀, Mikawa, Nagano Pref., length about 9.5 mm; K–L, ♂, do., Yatsugatake Mts, Nagano Pref., length about 8.5 mm.

**Type material examined.** ♂ (holotype, Figs 3D, 7C–D, 8B), "Senzu [35°06'N, 138°08'E], Shizuoka Pref., 2.VIII.1965, K. Kojima" "Holotype, *Acantholyda flaviventris* n. sp., Shinohara, 1991" (OMNH).

**Host plant.** Unknown.

**Remarks.** This large, pale-colored species was described on the basis of one male, and no additional material has become available. It differs from its Japanese congeners by the entirely pale yellowish antennal scape and hind femur. Pale, large male specimens of *A. posticalis posticalis* may resemble *A. flaviventris*, but *A. p. posticalis* has the para-antennal fields entirely smooth and glabrous (as in *A. aglaia stigma* and *A. laricis*, Fig. 3E–F), whereas *A. flaviventris* has these areas distinctly punctate and pilose dorsally (Fig. 3D). *Acantholyda mizunoi* also has an entirely pale antennal scape, but this species is otherwise very dark in coloration, having an (almost) entirely black thorax and abdomen (compare Figs 4I–J and 7C–D).

#### *Acantholyda (Itycorsia) posticalis* (Matsumura, 1912)

**Remarks.** This is a widely distributed Palearctic species associated with two-neededled pines. I (Shinohara 2000) recently recognized seven closely related species in the *A. posticalis* group, of which five occur in Japan. I also subdivided *A. posticalis* into three subspecies, *A. posticalis posticalis* from Japan, *A. posticalis koreana* Shinohara, 2000 from Korea, and *A. posticalis pinivora* Enslin, 1918 widely distributed from Europe to Siberia and China. Though the last-mentioned subspecies has been frequently cited as a major pest of pine forests in Europe, Siberia, and China (Roberti 1951; Kolomyietz 1967; Zhao *et al.* 1986), the Japanese nominotypical subspecies is uncommon and has not been recorded as a pest.

Gussakovskij (1935), Takeuchi (1938), Kim (1970), and Kim *et al.* (1994) called this species “*Lyda nemoralis* Thomson, 1871” or “*Acantholyda nemoralis* Thomson, 1871.” However, they were certainly wrong, because Thomson (1871: 301) did not propose a new taxon, but simply redescribed what he believed to be a Linnaean species originally described as *Tenthredo nemoralis* Linnaeus, 1758. The Linnaean species is now known as a species in the pamphiliine genus *Neurotoma*, *Neurotoma nemoralis* (Linnaeus, 1758).

#### *Acantholyda (Itycorsia) posticalis posticalis* (Matsumura, 1912)

*Lyda posticalis* Matsumura, 1912: 76.

*Acantholyda posticalis*: Takeuchi 1923: 362.

*Acantholyda pinivora*: Takeuchi 1930: 4 [part, not Enslin, 1918: 678].

*Acantholyda nemoralis*: Takeuchi 1938: 207 [part, not Linnaeus, 1758: 558; erroneously attributed to Thomson, 1871].

*Acantholyda posticalis posticalis*: Lee 1961: 2 [part]; Shinohara 2000: 63.

For more synonymy and references, see Shinohara (2000).

**Distribution.** Japan (western to central Honshu, Shikoku, Kyushu, Tsushima Is.).

**Type material examined.** ♀ (lectotype), “Japan, Matsumura 15/VI 1906 Tokyo” “25” “*Lyda posticalis* Mats. det. Matsumura” “Type Matsumura” “Lectotype, *Lyda posticalis* Matsumura, 1912, Det. A. Shinohara, 1996” (HU).

**Other material examined.** Material listed by Shinohara (2000). Honshu—21 ♀, 6 ♂ from Tochigi, Tokyo, Nagano, Mie, Kyoto, Osaka, Hyogo, Hiroshima, and Yamaguchi Prefectures; Shikoku—1 ♀ from Ehime Prefecture; Kyushu—1 ♀ from

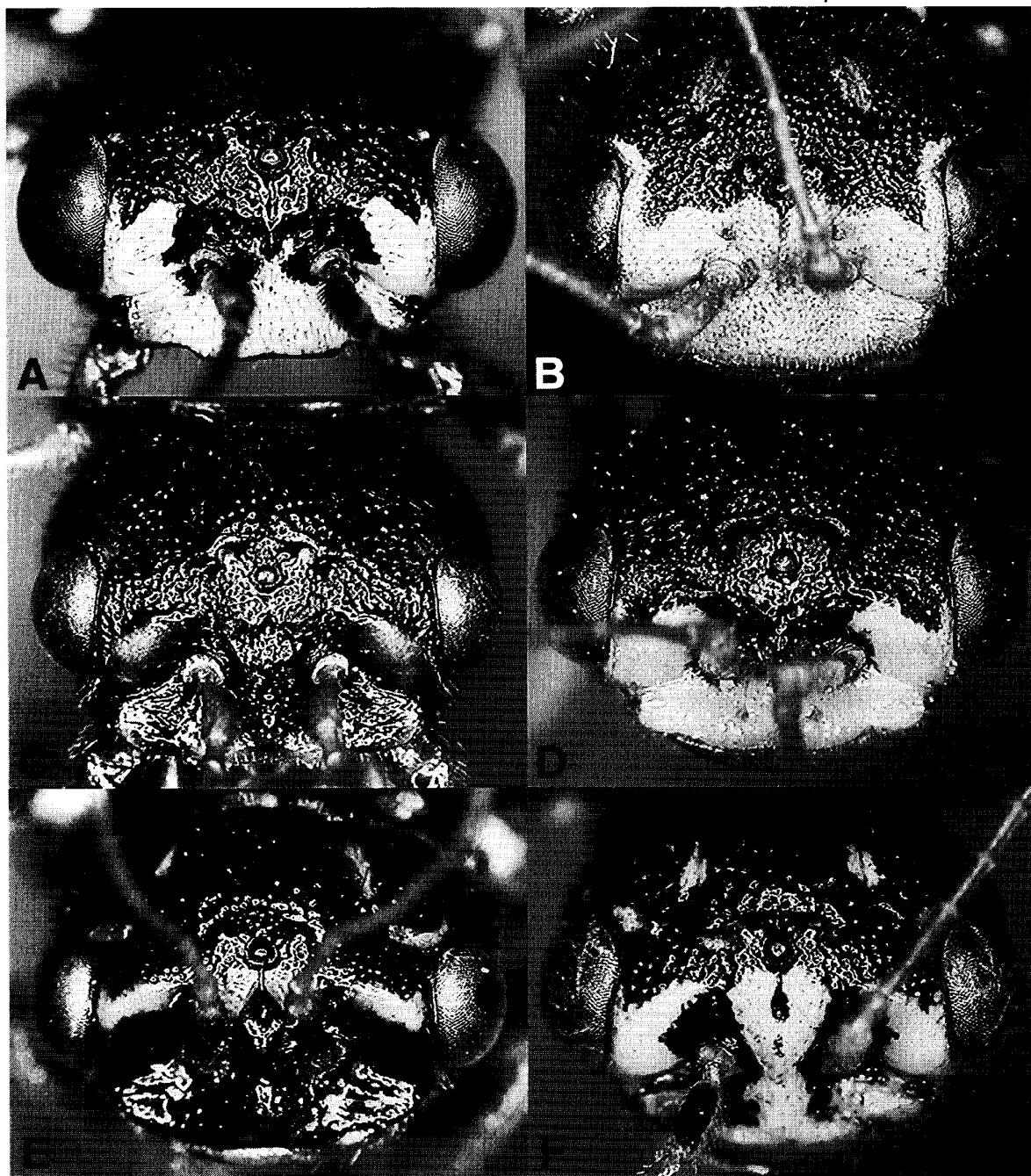


Fig. 8. *Acantholyda* spp., heads, dorsofrontal views. A, *A. tsuyukii*, ♂, topotypic paratype, width about 2.8 mm; B, *A. flaviventris*, ♂, holotype, width about 3.5 mm; C, *A. aglaia stigma*, ♀, holotype, width about 3.5 mm; D, do., ♂, paratype, Shiojiri-shi, Nagano Pref., width about 2.8 mm; E, *A. laricis*, ♀, Mikawa, Nagano Pref., width about 2.7 mm; F, do., ♂, Yatsugatake Mts, Nagano Pref., width about 2.3 mm.

Fukuoka Prefecture and 1 ♀ from Tsushima Is., Nagasaki Prefecture.

**Host plant.** *Pinus densiflora* (Shinohara 2000).

**Remarks.** *Acantholyda posticalis posticalis* occurs in the lowlands to lower mountains of central to western Honshu, Shikoku, and Kyushu including Tsushima Is. Among the *Acantholyda* species occurring in these areas, this species is recognized by its large size (female length 11.5–15 mm, commonly around 13 mm or larger; male length 11–12 mm), pale coloration (richly marked with pale yellow or pale brown, with the stigma pale brown), and the entirely smooth and glabrous para-antennal fields.

Of the five Japanese species I included in the *A. posticalis* group (Shinohara 2000), the four other species are distributed in more northern regions or higher mountains, associated with five-needed pines (so far as is known), and they are generally smaller in size. See the respective species for more details.

#### *Acantholyda (Itycorsia) alpina* Shinohara, 2000

*Acantholyda posticalis*: Takeuchi 1955: 113, pl. 51, 745 [part, not Matsumura, 1912: 76.]

*Acantholyda alpina* Shinohara, 2000: 82.

See Shinohara (2000) for more references.

**Distribution.** Japan (northern to central Honshu).

**Type material examined.** ♀ (holotype), “Mt. Norikuradake [36°06'N, 137°33'E], Gifu Pref., 5.VIII.1966, A. Shinohara” “Holotype, *Acantholyda alpina* sp. nov., Shinohara, 2000”; 19 ♀, 20 ♂ (paratypes) from Yamagata, Fukushima, Nagano, Gifu, Toyama, and Ishikawa Prefectures listed by Shinohara (2000).

**Host plant.** Unknown, but most probably *Pinus pumila*.

**Remarks.** This is a small species of the *A. posticalis* group (Shinohara 2000) found only in the alpine *Pinus pumila* zones in northern to central Honshu. It often occurs together with another pamphiliid, *Cephalcia variegata* Takeuchi, 1930, the larvae of which are gregarious webspinners on *Pinus pumila* (Togashi and Yoshida 1988). Superficially these two species resemble each other, but they can be easily separated by the generic character. *Acantholyda alpina* has a preapical spur on the fore tibiae while it is missing in *Cephalcia variegata*. From the other members of the *A. posticalis* group, *A. alpina* may be distinguished by its small size (female length 9.5–12 mm, usually around 11 mm, and male length 8–9.5 mm), usual presence of black marks on the ventral side of the mandibles, weakly pigmented wings and veins in both sexes, and presence of a pale circular mark on the mesonotum and a pale mark on the pseudosternum in the females.

#### *Acantholyda (Itycorsia) kojimai* Shinohara, 2000

*Acantholyda kojimai* Shinohara, 2000: 86.

**Distribution.** Japan (northern to central Honshu).

**Type material examined.** ♀ (holotype), “Sainogawara [38°08'N, 140°28'E],

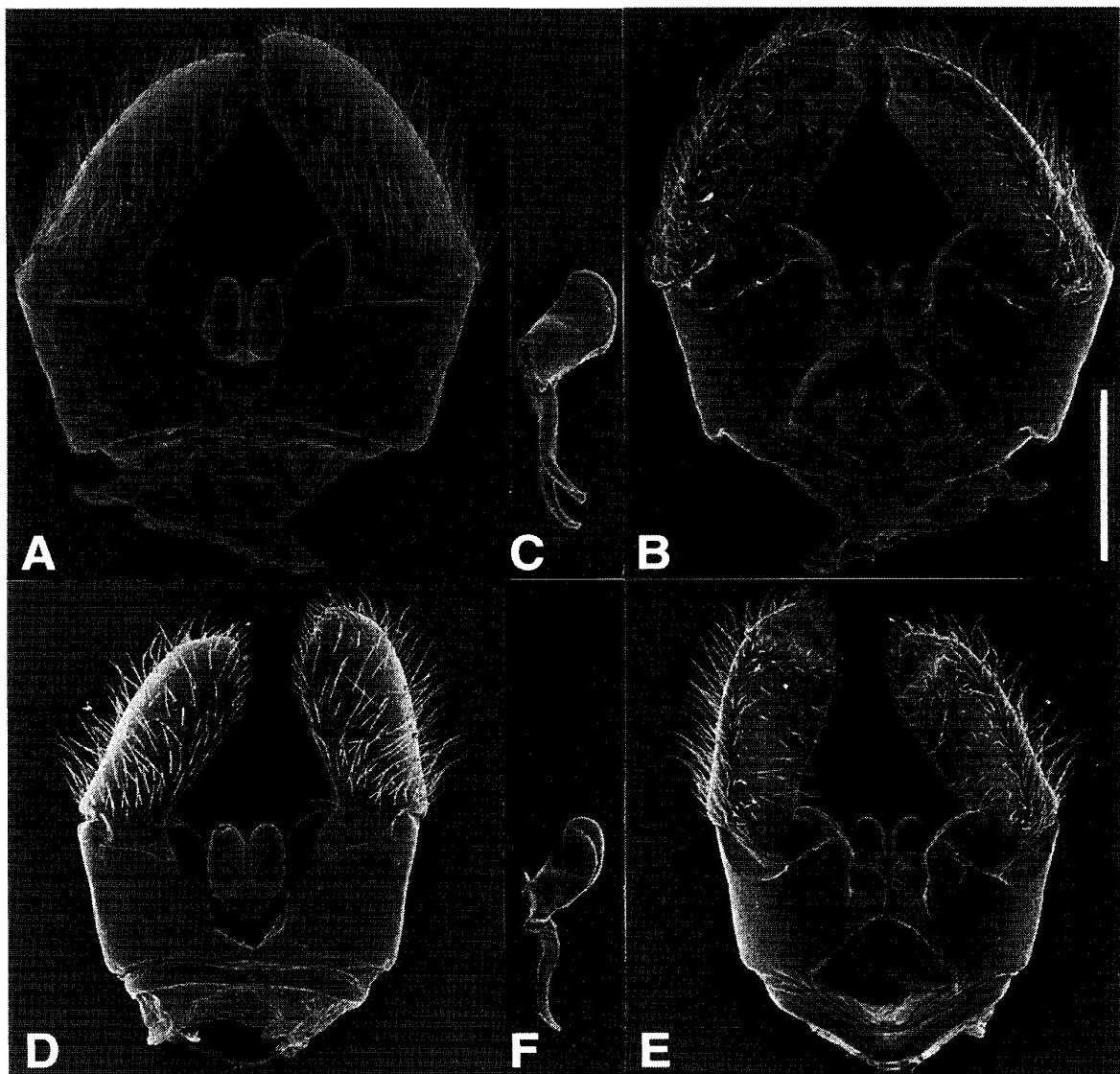


Fig. 9. Male genitalia, *Acantholyda mizunoi*, paratype, Masutomi-kōsen, Yamanashi Pref. (A-C) and *A. tsuyukii*, paratype, Shiga-kōgen, Nagano Pref. (D-F). A, D, Dorsal views; B, E, ventral views; C, F, penis valves, lateral views. Scale: 0.5 mm.

Zaōsan Mountains, Miyagi Pref., 25.VII.1976, A. Shinohara" "Holotype, *Acantholyda kojimai* sp. nov., Shinohara, 2000"; 17 ♀, 44 ♂ (paratypes) from Aomori, Miyagi, Niigata, Fukushima, Tochigi, Gunma, and Nagano Prefectures listed by Shinohara (2000).

**Host plants.** *Pinus parviflora* Sieb. & Zucc., *Pinus pumila* (Shinohara 2000).

**Remarks.** This species has been found in the alpine *Pinus pumila* zones as well as in the *Pinus parviflora* stands in the montane zones of northern to central Honshu. It belongs to the *A. posticalis* group and is most closely related to *A. alpina*, but it is slightly larger and darker in coloration. See Shinohara (2000) for a detailed comparison between the two species.

*Acantholyda (Itycorsia) pirica* Shinohara, 2000

*Acantholyda pirica* Shinohara, 2000: 90.

**Distribution.** Japan (Hokkaido), Russia (Sakhalin).

**Type material examined.** ♀ (holotype), "Mt. Rishiridake [45°13'N, 141°13'E], 700–800 m, Oshidomari-guchi, Rishiri-to Is., Soya, Hokkaido, 26.VI.1990, A. Shinohara" "Holotype, *Acantholyda pirica* sp. nov., Shinohara, 2000"; 13 ♂ (paratypes) from northern and eastern Hokkaido and Sakhalin listed by Shinohara (2000).

**Host plant.** Unknown, but probably *Pinus pumila*.

**Remarks.** This is another member of the *A. posticalis* group (Shinohara 2000), and it has been found only in the alpine *Pinus pumila* zone on Mt. Rishiridake, Mt. Piyashiriyama, and Mt. Meakandake in northern and eastern Hokkaido and Mt. Lopatin in central Sakhalin. It is characterized by the apparently specialized, trilobed anterior margin of the clypeus.

*Acantholyda (Itycorsia) kumamotoi* Shinohara, 2000

*Acantholyda kumamotoi* Shinohara, 2000: 94.

**Distribution.** Japan (northern Honshu).

**Type material examined.** ♀ (holotype), "Iide (Yamagata-ken), 10.VII.1975" "Kumamoto 2" "Holotype, *Acantholyda kumamotoi* sp. nov., Shinohara, 2000."

**Host plant.** Unknown.

**Remarks.** This species is known only from the female holotype. It belongs to the *A. posticalis* group (Shinohara 2000) and probably is closest to *A. parki* Shinohara and Byun, 1996, a pest of *Pinus koraiensis* in Korea and Primorskij Kraj. *Acantholyda kumamotoi* is separated from the related Japanese species by its small size, pale-marked pseudosternum, and mostly pale brown abdomen.

*Acantholyda (Itycorsia) aglaia* Zhelochovtsev, 1968

*Acantholyda aglaia* Zhelochovtsev, 1968: 50.

*Acantholyda aglaia*: Shinohara and Hara 2000: 2.

For more synonymy and references, see Shinohara and Hara (2000).

**Remarks.** This spruce-feeding, eastern Palearctic species was recently discussed by Shinohara and Hara (2000), who recognized two subspecies, *A. aglaia aglaia* Zhelochovtsev, 1968 from eastern Siberia and the Russian Far East and *A. aglaia yezoensis* from Hokkaido, Japan. After Shinohara and Hara's (2000) paper was accepted for publication, I was able to examine several specimens of this species collected in central Honshu. They differ from the specimens of the two previously described subspecies in the color of the stigma, and I here treat them as representing a new subspecies described below.

The two subspecies of *A. aglaia* occurring in Japan may be distinguished from their Japanese congeners by the combination of their large size (length 12–14 mm

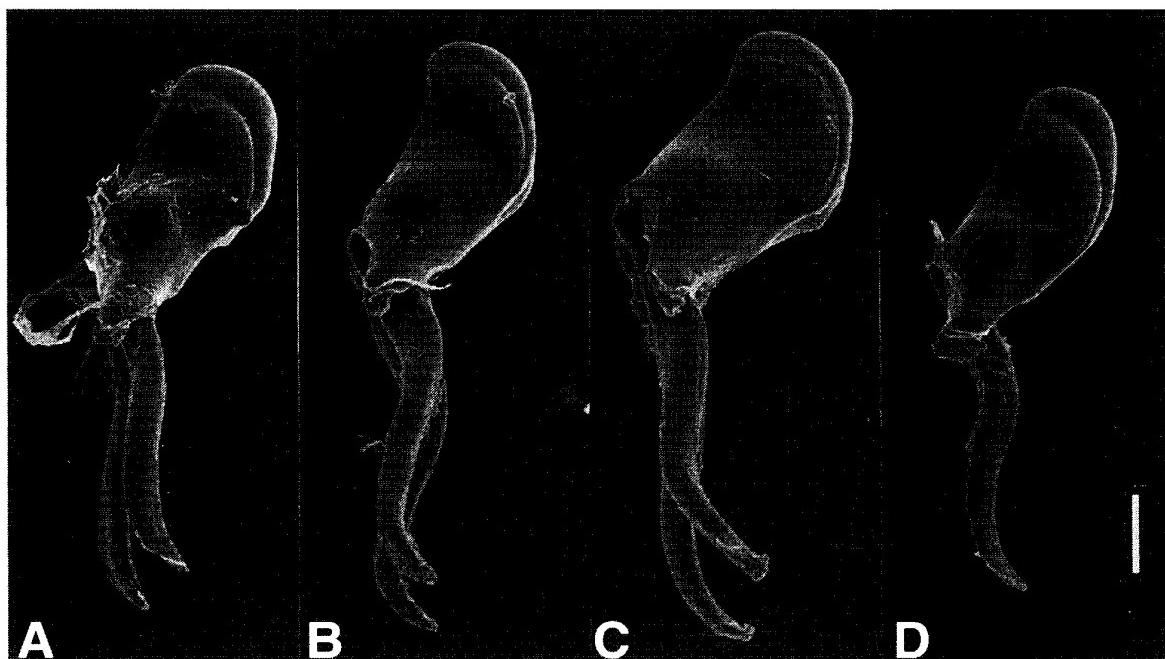


Fig. 10. *Acantholyda* spp., penis valves, lateral views. A, *A. albomaculata*, Mt. Kinpuzan, Yamanashi Pref.; B, *A. iwatai*, Fuji-rindō, Yamanashi Pref.; C, *A. mizunoi*, paratype, Masutomi-kōsen, Yamanashi Pref.; D, *A. tsuyukii*, paratype, Shiga-kōgen, Nagano Pref. Scale: 0.1 mm.

in female and 10.5–13 mm in male, smaller in reared material as noted below), the mostly black head with pale, impunctate and glabrous para-antennal fields, the entirely black ventral side of the thorax, the strongly infuscated wings, the blackish brown stigma (with its apical third, except for the anterior and posterior margins, being pale brown in *A. a. yezoensis*), and the often largely brownish (or reddish brown) dorsum of the abdomen in the female, and mostly black, laterally brown abdomen in the male.

*Acantholyda (Itycorsia) aglaia stigma* subsp. nov.  
(Figs 3E, 7E–H, 8C–D)

**Female** (holotype, Fig. 7E–F). Length about 12.5 mm. Anterior half of clypeus and most of para-antennal field pale yellowish to brownish; antennal scape and pedicel entirely pale yellowish to brownish (Fig. 8C); mesoscutal lateral lobe entirely black; stigma entirely brown to black; hind tibia entirely pale brown. Right antenna with 34 segments and left one with 35; 3rd antennal segment about  $2.6 \times$  length of 4th; forewing with cell C pilose in apical half and stub of crossvein  $m+cu-a$  very short; hindwing lacking apical stub of 2A.

**Male** (paratype, Fig. 7G–H). Length about 9.5 mm. Entire clypeus, para-antennal field, and gena (except for posterior half and dorsal part) pale yellow (Fig. 8D); pale mark on mesoscutal median lobe nearly missing. Both antennae 35-segmented, with 3rd segment about  $2.3 \times$  length of 4th; forewing with cell C sparsely pilose in apical part and stub of crossvein  $m+cu-a$  missing; hindwing lacking api-

cal stub of 2A.

This subspecies otherwise agrees with the recent description of *A. aglaia yezoensis* by Shinohara and Hara (2000).

**Distribution.** Japan (Honshu).

**Type series.** Holotype: ♀ (Figs 3E, 7E–F, 8C), Katakura [35°56'N, 138°06'E], 950 m, Takatō-machi, Nagano Pref., 24.VI.1979, swept from *Picea abies*, H. Kojima. Paratypes: Nagano Pref.: 2 ♀, Kataoka, 850m, Shiojiri city, larva on *Picea shirasawae* collected VI.1998, entered soil 2.VII., adult emerged 16.V.1999, H. Kojima; 1 ♀, same locality, larva on *Picea koyamae* collected VI.1998, entered soil 30.VI., adult emerged 16.V.1999, H. Kojima; 1 ♂ (Figs 7 G–H, 8 D), same locality, larva on *Picea koyamae* collected VI.1998, entered soil 2.VII., adult emerged 31.III.1999, H. Kojima. Gifu Pref.: 1 ♀, "Ontake, Gifu, *Abies*, 10.V.1967 Em., T. Okutani leg." "Acantholy." (KU)

**Variation.** The type series consists of one field-collected and four reared females and one reared male. The reared females (paratypes) are smaller (about 9.5–11 mm) than the field-collected specimen (holotype, about 12.5 mm) and are possibly more or less unusual. They are generally light-colored; two specimens from Kataoka, one reared on *Picea shirasawae* and the other on *P. koyamae*, have varying expanses of rather obscure pale brownish to dirty dark yellowish markings on the gena, vertex (along the lateral sutures), frons, and posterior and ventral margins of the pronotum, and they have the abdomen mostly pale brown above. The remaining specimen from Kataoka is dark-colored like the holotype, although the gena has a large, pale yellow spot and the ventral margin of the pronotum is extensively pale yellow. The only specimen from Ontake was reared on "*Abies*" and has a very pale coloration, possibly because it was teneral when killed. It resembles the pale specimen from Kataoka but has more brownish areas on the head and thorax, with the normally black areas, including the cervical sclerite, mesoscutum, and metepisternum, being partly obscurely brownish. In the three specimens from Kataoka, only one antenna is intact, with 35 segments, and the third antennal segment is about 2.5–2.7 times as long as the fourth in all three specimens. One antenna of the Ontake specimen is 31-segmented and the third segment is about 2.2 times as long as the fourth.

**Host plants.** *Picea shirasawae* Hayashi, *P. koyamae* Shirasawa, *Abies* sp. The holotype was collected on *Picea abies* (L.) Karst., which may prove to be another host plant.

**Etymology.** The new subspecific name refers to the entirely blackish brown stigma in the forewing.

**Remarks.** This new subspecies has been found in the mountains of central Honshu. It is distinguished from the other two subspecies, *A. aglaia aglaia* and *A. aglaia yezoensis*, by the entirely blackish brown stigma of the forewing. The female of *A. aglaia stigma* is similar to that of *A. aglaia yezoensis* in other characters (coloration of the clypeus, para-antennal fields, antennal scape and pedicel, and hind tibiae) but has no pale mark on the mesoscutal lateral lobe as in the nominotypical subspecies. The male has a pale color pattern of the head as in *A. aglaia yezoensis*, whereas the pale mark on the mesoscutal median lobe is nearly missing.

The four paratypes from Kataoka were reared from larvae feeding on *Picea* spp., whereas another paratype from Ontake bears a label suggesting that the specimen was reared on *Abies*. This is the first record of *Abies* as a host plant of *Acan-*

*tholyda* in the Palearctic Region.

***Acantholyda (Itycorsia) aglaia yezoensis* Shinohara and Hara, 2000**

*Acantholyda* sp. 1: Higashiura *et al.* 1992: 18.

*Acantholyda aglaia yezoensis* Shinohara and Hara, 2000: 4.

**Distribution.** Japan (Hokkaido).

**Type material examined.** ♀ (holotype), “Toyotaki [42°56'N, 141°14'E], nr. Jōzankei, Ishikari Co., Hokkaido, swept from *Picea abies*, 26.VI.1986, A. Shinohara” “Holotype, *Acantholyda aglaia* subsp. nov., Shinohara and Hara, 2000”; 4 ♀, 16 ♂ (paratypes) listed by Shinohara and Hara (2000).

**Host plants.** *Picea abies* (Shinohara and Hara 2000).

**Remarks.** This recently described subspecies was collected mainly from the foliage of *Picea abies* in Hokkaido. Two other *Acantholyda* species are known from the island. One of them, *A. pirica*, is confined to the high altitudes where the dwarf stone pine *Pinus pumila* predominates, and the other, *A. nipponica*, has been found only in or near larch plantations in western Hokkaido.

This subspecies is easily separated from the Honshu subspecies *A. aglaia stigma* by the bicolored stigma. The larva is a solitary webspinner on *Picea abies*. For more information on this subspecies, including its biology, see Shinohara and Hara (2000).

***Acantholyda (Itycorsia) laricis* (Giraud, 1861)**

(Figs 3F, 7I–L, 8E–F)

*Lyda laricis* Giraud, 1861: 91.

*Acantholyda laricis*: Takeuchi 1938: 209 [part]; Abe and Togashi 1989: 541; Shinohara 1997: 195.

See Shinohara (1997) for more references.

**Distribution.** Europe to Siberia and China; Japan (central Honshu).

**Material examined.** Material listed by Shinohara (1997). Honshu—3 ♀, 2 ♂ from Yamanashi and Nagano Prefectures. 3 ♀ from Europe, 1 ♀ from Siberia, and 1 ♀ from China. Additional material. Nagano Pref.: 1 ♀ (Figs 3F, 7I–J, 8E), “Mikawa, Minamiaiki-mura, 8.VI.1999, H. Hamaji.”

**Variation.** Shinohara (1997) discussed the variation of this species. One additional female from Mikawa is 9.5 mm long and has an obscure pale spot on the anterior part of the clypeus and a large transverse spot along the dorsal margin of each para-antennal field (Fig. 8E). The pale marking on the mesoscutal lateral lobe is very obscure. The antennae have 26 and 27 segments, with the third segment about 2.1 times as long as the fourth.

**Host plants.** *Larix decidua* Mill. (Pschorn-Walcher and Zinnert 1971). *Larix sibirica* Ledeb. (Verzhutskij 1970). *Larix gmelini* (Rupr.) Rupr. (Xiao *et al.* 1992).

**Remarks:** *Acantholyda laricis* is a small species (length of female 9–10.5 mm and of male about 8.5 mm) of *Itycorsia* further characterized as follows: black, with

pale yellow or brownish markings (Fig. 7I-L); mesoscutum usually with median and lateral lobes marked with pale yellow; mesoscutellum usually entirely black; wings infuscated at least below stigma; stigma black in basal half and pale brown in apical half; abdomen black, with lateral margins of dorsum, laterotergites, and apical margins of sterna pale brown; and para-antennal field roundly swollen, very smooth and impunctate (Fig. 3F). This combination of characters distinguishes *A. laricis* from the other species of the genus.

This species was recently discussed by Shinohara (1997). It is rather rare in Japan, known only from several specimens collected in the mountains of central Honshu. Takeuchi (1938) first recorded this species from Japan, but all of his material from Japan actually belongs to *A. tsuyukii* described above.

### Acknowledgments

I thank Mr. H. Kojima, Nagano, who generously offered all his information on the host plants and an invaluable collection of *Acantholyda* species accumulated through his own attempts to rear conifer-feeding sawflies over the last 20 years. I also thank the following persons who have made material available for study: Mr. H. Hamaji (Tokyo), Dr. S. Hashimoto (Meijo University, Nagoya), Drs M. Ishii and T. Hirowatari (University of Osaka Prefecture, Sakai), Mr. I. Kanazawa (Osaka Museum of Natural History, Osaka), Mr. H. Kumamoto (Hirakata), Mr. K. Mizuno (Kyoto), Mr. H. Nagase (Kamakura), Dr. T. Naito (Kobe University, Kobe), Dr. K. Nakamura (Utsunomiya University, Utsunomiya), Drs N. Ohbayashi and M. Sakai (Ehime University, Matsuyama), Mr. T. Saito (Yaita), Dr. M. Satō (Nagoya Women's University, Nagoya), Dr. M. Suwa (Hokkaido University, Sapporo), Mr. N. Takeuchi (Tokyo), Mr. S. Tsuyuki (Zushi), Mr. M. Yamada (Hirosaki). Many thanks are due to Drs S.-I. Uéno (National Science Museum, Tokyo), D. R. Smith (USDA, Washington, D. C.), H. Goulet (Centre for Land and Biological Resources Research, Ottawa), and M. J. Grygier (Lake Biwa Museum, Kusatsu) for carefully reviewing the manuscript, and Dr. S. Akiyama (National Science Museum, Tokyo) for her helpful comments on the scientific names of host plants. This work was supported in part by a Grant-in-aid for Scientific Research, No. 10836021, from the Ministry of Education, Science, Sports and Culture, Japan.

### References

- Abe, M. and Togashi, I. 1989. Pamphilidae [sic]. Pp. 541–542. In: Hirashima, Y. (Ed. Supervisor) *A Check List of Japanese Insects*. Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka. [In Japanese]
- Achterberg, C. van and Aartsen, B. van 1986. The European Pamphiliidae (Hymenoptera: Symphyta), with special reference to the Netherlands. *Zoologische Verhandelingen* (234): 1–98.
- Beneš, K. 1968. A new genus of Pamphiliidae from East Asia (Hymenoptera, Symphyta). *Acta Entomologica Bohemoslovaca* 65: 458–463.
- Beneš, K. 1972. Generic classification of the tribe Pamphiliini (Hymenoptera, Pamphiliidae). *Acta Entomologica Bohemoslovaca* 69: 378–395.

- Beneš, K. 1974. The Siberian species of *Pamphilius* Latr. related to *P. histrio* Latr. (Hymenoptera, Pamphiliidae). *Acta Entomologica Bohemoslovaca* 71: 298–314.
- Benson, R. B. 1945. Classification of the Pamphiliidae (Hymenoptera, Symphyta). *Proceedings of the Royal Entomological Society of London (B)* 14: 25–33.
- Benson, R. B. 1968. Hymenoptera from Turkey. Symphyta. *Bulletin of the British Museum (Natural History), Entomology* 22: 109–207.
- Blank, S. M., Shinozawa, A. and Taeger, A. 1998. Revisionary notes on pamphiliid sawflies (Hymenoptera, Symphyta: Pamphiliidae). *Deutsche Entomologische Zeitschrift* 45: 17–31.
- Costa, A. 1860. Trivellanti sessiliventri, Famiglia de'Lididei. Pp. 1–4. In: *Fauna del Regno di Napoli, Imenotteria, parte IIIa*. Antonio Cons, Napoli.
- Costa, A. 1894. *Prospetto degli Imenotteri Italiani da Servire di Prodromo di Imenotterologia Italiana, Parte Terza. Tenthredinidei e Siricidei*. Accademia Reale delle Scienze, Napoli, 290pp.
- Eidt, D. C. 1969. The life histories, distribution, and immature forms of the North American sawflies of the genus *Cephalcia* (Hymenoptera: Pamphiliidae). *Memoirs of the Entomological Society of Canada* (59): 1–56.
- Enslin, E. 1918. Die Tenthredinoidea Mitteleuropas, VII (Schluss). *Deutsche Entomologische Zeitschrift, Beiheft* 7: 663–790.
- Giraud, J. 1861. Description de deux Hyménoptères nouveaux du genre *Lyda*, accompagnée de quelques observations sur les espèces connues, de ce genre, qui se trouvent en Autriche. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 11: 81–92.
- Greenbaum, H. N. 1975. A new species of *Acantholyda* from Florida, with keys to the adults and larvae of Florida species (Hymenoptera: Pamphiliidae: Cephalciinae). *Florida Entomologist* 58: 45–52.
- Gussakovskij, V. V. 1935. *Chalastogastra (pt. 1). Faune de l'URSS (n. s. 1), Insectes Hyménoptères, II (1)*. Édition de l'Académie des Sciences de l'URSS, Moscou, Leningrad, xviii+453pp. [In Russian with German summary]
- Higashiura, Y., Hara, H. and Kikuchi, T. 1992. [Development of a technique for forecasting the mass occurrence of insect pests on *Picea glehnii*.] *Hokkaido Ringyō Shikenjō Nenpō* 1991: 17–18. [In Japanese]
- Inoue, M. 1960. *Ringyō Gaichū Bōjo Ron, Ge Kan (1) [Manual of Forest Insect Pest Control, Final Volume (1)]*. Chikyū Shuppan, Tokyo, 210pp. [In Japanese]
- International Commission on Zoological Nomenclature 1954. Opinion 290. Validation of the generic names *Acantholyda* Costa, 1894 and *Acanthocnema* Becker, 1894. *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature* 8: 91–97.
- Kim, C. W. 1970. *Illustrated Encyclopedia of Fauna and Flora of Korea*, 11 (3). Samwha Chulpansa, Seoul, 891pp. [In Korean]
- Kim, C. W., Lee J. W., Park J. S., Kim B. J. and Park J. C. 1994. Hymenoptera. Pp. 216–269. In: *The Entomological Society of Korea and Korean Society of Applied Entomology, Check List of Insects from Korea*. Kon-Kuk University Press, Seoul.
- Kolomyietz, N. G. 1967. *Sawfly Weaver (Distribution, Biology, Damage, Natural Enemies, Control)*. Nauka, Novosibirsk, 136pp. [In Russian]
- Konow, F. W., 1897. Systematische und kritische Bearbeitung der Blattwespen-Tribus Lydini. I. *Annalen des Kaiserlich-Königlichen Naturhistorischen Hofmuseums*, Wien 12: 1–32.
- Lee, D.-S. 1961. Studies on a Korean unrecorded pamphiliid[sic]-sawfly (Hymenoptera, Symphyta) feeding on Korean pine. Taxonomical and morphological studies. *Korean Journal*

- of Zoology 4: 1–6.
- Linnaeus, C. 1758. *Systema Naturae, per Regna Tria Naturae Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Regnum Animale*, ed. 10. Vol. 1. Holmiae, 826pp.
- Matsumura, S. 1912. *Thousand Insects of Japan, Suppl. IV*. Keiseisha, Tokyo, 247pp., 14pls. [In Japanese and English]
- Middlekauff, W. W. 1958. The North American sawflies of the genera *Acantholyda*, *Cephalcia* and *Neurotoma* (Hymenoptera: Pamphiliidae). University of California Publications in Entomology 14: 51–174.
- Ohwi, J. 1965. *Flora of Japan, Revised Edition*. Shibundo, Tokyo, 1560pp. [In Japanese]
- Okutani, T. 1967. Food plants of Japanese Symphyta (I). Japanese Journal of Applied Entomology and Zoology 11: 43–49. [In Japanese]
- Pesarini, C. and Pesarini, F. 1976. Materiali per un catalogo degli Imenotteri Sinfitti italiani. I. Famiglia Pamphiliidae (Hymenoptera). Bollettino della Società Entomologica Italiana 108: 53–66.
- Pschorr-Walcher, H. and Zinnert, K. D. 1971. Zur Larvalsystematik, Verbreitung und Ökologie der europäischen Lärchen-Blattwespen. Zeitschrift für Angewandte Entomologie 68: 345–366.
- Roberti, D. 1951. La lida del pino (*Acantholyda nemoralis* Thomson). Bollettino del Laboratorio di Entomologia Agraria, Portici 10: 25–85.
- Rohwer, S. A. 1910. Notes on Tenthredinoidea, with descriptions of new species. Paper XI. Genera of Pamphiliidae and new species. Canadian Entomologist 42: 215–220.
- Ross, H. H. 1937. A generic classification of the Nearctic sawflies (Hymenoptera). Illinois Biological Monographs 15(2): 1–173.
- Saito, K. 1928. [Notes on the pests of red pine in Korea.] Journal of the Chosen Natural History Society (7): 10–13. [In Japanese]
- Sasaki, C. 1901. *Nippon Jumoku Gaichū Hen, Jō Kan [Manual of the Insect Pests of Trees in Japan, First Volume]*. Keigyōsha, Tokyo, 190pp. [In Japanese]
- Shinohara, A. 1985. Two new species of Cephalciinae from Japan (Hymenoptera, Pamphiliidae). Kontyū, Tokyo 53: 90–96.
- Shinohara, A. 1988. Notes on *Acantholyda aglaia* (Hymenoptera, Pamphiliidae), with new synonymy. Kontyū, Tokyo 56: 514.
- Shinohara, A. 1991a. Pamphiliid sawflies (Hymenoptera) from Taiwan. Bulletin of the National Science Museum, Tokyo, Ser. A 17: 173–181.
- Shinohara, A. 1991b. A new web-spinning sawfly of the genus *Acantholyda* (Hymenoptera, Pamphiliidae) from Japan. Proceedings of the Japanese Society of Systematic Zoology (44): 65–68.
- Shinohara, A. 1995. Notes on a pine web-spinning sawfly *Acantholyda sasakii* (Hymenoptera, Pamphiliidae). Memoirs of the National Science Museum, Tokyo (28): 165–167.
- Shinohara, A. 1997. Webspinning sawflies (Hymenoptera, Pamphiliidae) feeding on larch. Bulletin of the National Science Museum, Tokyo, Ser. A 23: 191–212.
- Shinohara, A. 2000. Pine-feeding webspinning sawflies of the *Acantholyda posticalis* group (Hymenoptera, Pamphiliidae). Bulletin of the National Science Museum, Tokyo, Ser. A 26: 57–98.
- Shinohara, A. and Byun, B. K. 1996. Conifer-feeding webspinning sawflies of the genus *Acantholyda* (Hymenoptera, Pamphiliidae) from Korea. Insecta Koreana 13: 91–104.
- Shinohara, A. and Hara, H. 2000. Notes on a spruce-feeding webspinning sawfly, *Acantholyda aglaia* (Hymenoptera, Pamphiliidae), with description of a new subspecies from

- Hokkaido, Japan. Bulletin of the National Science Museum, Tokyo, Ser. A 26: 1–11.
- Shinohara, A. and Smith, D. R. 1979. The Sato types of sawflies (Hymenoptera, Symphyta). Bulletin of the National Science Museum, Tokyo, Ser. A 5: 281–288.
- Smith, D. R. 1988. A synopsis of the sawflies (Hymenoptera: Symphyta) of America south of the United States: Introduction, Xyelidae, Pamphiliidae, Cimbicidae, Diprionidae, Xiphydriidae, Siricidae, Orussidae, Cephidae. Systematic Entomology 13: 205–261.
- Taeger, A., Altenhofer, E., Blank, S. M., Jansen, E., Kraus, M., Pschorn-Walcher, H. and Ritzau, C. 1998. Kommentare zur Biologie, Verbreitung und Gefährdung der Pflanzenwespen Deutschlands (Hymenoptera, Symphyta). Pp. 49–135. In: Taeger, A. and Blank S. M. (Eds) *Pflanzenwespen Deutschlands (Hymenoptera, Symphyta), Kommentierte Bestandsaufnahme*. Goecke & Evers, Keltern.
- Takeuchi, K. 1923. A list of Pamphiliidae of Japan. Insect World, Gifu 27: 362–366. [In Japanese]
- Takeuchi, K. 1930. A revisional list of the Japanese Pamphiliidae, with descriptions of nine new species. Transactions of the Kansai Entomological Society 1: 3–16.
- Takeuchi, K. 1938. A systematic study on the suborder Symphyta of the Japanese Empire (I). Tenthredo, 2: 173–229.
- Takeuchi, K. 1955. *Coloured Illustrations of the Insects of Japan, Vol. II*. Hoikusha, Osaka, 190pp., 68pls. [In Japanese]
- Thomson, C. G. 1871. *Hymenoptera Scandinaviae, Tom. 1. (Tenthredo et Sirex Lin.)*. Ohlsson, Lundae, 342pp.
- Togashi, I. and Yoshida, N. 1988. Injury to *Pinus pumila* Regel by the larvae of *Cephalcia variegata* Takeuchi, and *Gilpinia daisetusana* Takeuchi in Japan, with a description of the larvae and life history of *Cephalcia variegata* (Hymenoptera: Diprionidae, Pamphiliidae). Canadian Entomologist 120: 185–188.
- Verzhutskij, B. N. 1970. Families Pamphiliidae, Deprionidae [sic], and Tenthredinidae. Pp. 164–194. In: Rozhkov, A. S. (Ed.) *Pests of Siberian Larch*. Israel Program for Scientific Translations, Jerusalem. [English translation; originally published in Russian in 1966]
- Verzhutskij, B. N. 1981. *Rastitel'noyadnye Nasekomye v Ekosistemakh Vostochnoj Sibiri (Pilil'shchiki i Rogokhvosty)* [Phytophagous Insects in the Ecosystem of Eastern Siberia (Sawflies and Woodwasps)]. Nauka, Novosibirsk, 304pp.
- Watanabe, F. 1937. Tenthredinidae. Pp. 5–8. In: *Nippon Jumoku Gaichū Sō Mokuroku [Catalogue of Insect Pests of Trees in Japan]*. Maruzen, Tokyo. [In Japanese]
- Xiao, G.-R., Huang, X.-Y., Zhou, S.-Z., Wu, J. and Zhang, P. 1992. *Economic Sawfly Fauna of China (Hymenoptera, Symphyta)*. Tianze Eldonejo, Beijing, 226pp. [In Chinese]
- Yano, M. 1916. [Scientific names of pine sawflies.] Insect World, Gifu 20: 179—181. [In Japanese]
- Yano, M. and Sato, K. 1928. Two new species of Chalastogastra (Hymenoptera) from Japan. Kontyû, Tokyo 2: 209–212. [In Japanese with English summary]
- Zhao, S.-F., Zhao, R.-L., Zhang, Z.-Y., Li, F.-Y. and Wang, Y.-T. 1986. *Shanxi Zhuyao Linmu Haichong Tupu, Zi Yi Ji [Illustrated Important Forest Insect Pests of Shanxi Province, Vol. 1]*. Zhongguo Linye Chubanshe, Beijing, 106pp. [In Chinese]
- Zhelochovtsev, A. N. 1968. [New species of Symphyta (Hymenoptera) of the fauna of the USSR.] Sbornik Trudov Zoologicheskogo Muzeya MGU 11: 47–56. [In Russian]